

QH
104.5
C45N2
c.2

NH

Natural Areas of the Chesapeake Bay Region

ECOLOGICAL PRIORITIES

Center for Natural Areas
Ecology Program
Smithsonian Institution

QH
104.5
C45 N2
c.2
NH

NATURAL AREAS OF THE CHESAPEAKE BAY REGION :

Ecological Priorities

A Report By

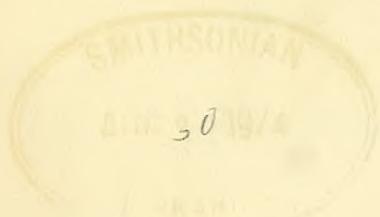
Center for Natural Areas

Ecology Program

Smithsonian Institution

May 1974

Dale W. Jenkins
Dale W. Jenkins, Ph. D.
Principal Investigator



ACKNOWLEDGEMENTS

This report would not have been possible without the generous financial aid and substantive guidance provided by three organizations: The Nature Conservancy, the Chesapeake Bay Foundation, and the Irving Kingsford Charitable Trust. We are most indebted to them for their kind support.

We would also like to thank Smithsonian staff who are not part of the Ecology Program but who nevertheless applied their valuable time and services to this effort, especially the energetic volunteers who came to us through the Smithsonian Associates volunteer program.

We are grateful to all those in the scientific community and other professions who have given their time and specialized competence to the study of natural history in the Bay region. We hope that they are all credited properly in the pages that follow.

Table of Contents

	page
Acknowledgements	i
List of Tables	iii
List of Maps	iv
I. INTRODUCTION	1
Objectives	4
Survey Concept	4
Scope of Survey	7
Sources of Information	7
Staff	10
II. PRESENTLY PROTECTED AND PRESERVED LANDS	11
Protected Federal Lands	13
Protected State and Local Lands	15
Preserved Natural Areas	18
III. DEFINING THE NATURAL AREAS	20
Important Biotic Communities	24
Rare and Endangered Animals	30
Rare and Endangered Plants	34
Range Phenomena	35
Seasonal Concentration of Animals	37
Commercial Game and Unusual Animal Populations	40
Paleontological Features	41
Well-documented Sites	42
Exceptional Individuals or Associations	42
Size of Areas	43
IV. RANKING THE AREAS	45
On Methods	45
The Numerical Ranking System	47
Example of the Rating System in Use	53
V. MASTER LIST OF NATURAL AREAS (Colored Section)	54
Primary Natural Areas Recommended for Protection	55
Secondary Areas Recommended for Consideration	73
Index of Areas by State and County	119
Index of Areas by Alphabetical Order	130
REFERENCES	141
APPENDIX A - DESCRIPTION OF THE CHESAPEAKE BAY REGION	
APPENDIX B - BIOTIC COMMUNITIES OF THE CHESAPEAKE BAY	
APPENDIX C - RARE, ENDANGERED AND THREATENED VERTEBRATE SPECIES OF THE CHESAPEAKE BAY REGION	
APPENDIX D - RARE, ENDANGERED AND ENDEMIC PLANTS OF THE CHESAPEAKE BAY REGION	
APPENDIX E - PRESENTLY PROTECTED AREAS OF THE BAY REGION	

LIST OF TABLES

	page
1. Agencies and Organizations Contacted in the Survey	8
2. Presently Protected Areas of Chesapeake Bay Region	12
3. Preserved Natural Areas	19
4. Criteria and Quantitative Values for Selection of Natural Areas	52
5. Master List of Natural Areas (Colored Section)	55

LIST OF MAPS

	<u>Page</u>
1. Map of Chesapeake Bay Region	6
2. Areas Currently Protected in Chesapeake Bay Region 1:250,000	6
3. Zoological Factors of Ecological Importance in the Chesapeake Bay Region 1:250,000	6
4. Botanical Factors of Ecological Importance in the Chesapeake Bay Region 1:250,000	6
5. Areas Proposed for Preservation in the Chesapeake Bay Region 1:250,000	6
6. Topographic Maps (280) of the Chesapeake Bay Region (7.5 minute USGS Quadrangles) 1:24,000	6

These maps are on file at The Nature Conservancy, the Chesapeake Bay Foundation, and the Center for Natural Areas. Copies may be obtained from the Center by calling (202) 381-6568.

I. INTRODUCTION

Chesapeake Bay and its watershed comprise one of the most productive estuarine areas of the world. It is not altogether coincidental that the Chesapeake Bay region also supports one of the nation's fastest-growing populations. The result is that the land, especially along the coast, is sprouting residential, commercial and recreational developments at an accelerating pace.

In a region that historically has been heavily lumbered and extensively tilled, the present encroachments severely threaten what few undisturbed natural areas still remain -- bogs, mature forests, tidal wetlands, swamps, marshes and other areas of importance to plant life, wildlife, fisheries and man. It is a familiar litany in most parts of the United States.

Recently private groups and public institutions and governments have recognized the urgency of preserving natural areas of various kinds. A number of states have endeavored to inventory the natural lands within their borders as a necessary first step in enacting protective measures. For example, New Jersey is preparing detailed maps of its coastal wetlands to form the basis of stringent new laws regulating development. Among notable state-wide inventories of natural areas are those of Wisconsin, Georgia, Illinois, Michigan and the New England states. About 30 states have some natural areas program underway.

Chesapeake Bay has not lacked such surveillance. A "Catalog of Natural Areas in Maryland" was prepared by the Maryland State Planning Department in 1968 and is presently (1973-74) being revised. This includes historical, geological and ecological areas for the entire state. Another report, "Integrity of Chesapeake Bay," done for Maryland, describes the Bay's problems and some goals for it in relation to water supply, pollution, population, recreation, transportation and industry.

A "Maryland Outdoor Recreation and Open Space Plan" was developed to provide recreation opportunities and guidelines for conserving and preserving depletable natural resources./ A few natural areas of high scenic or scientific value were earmarked for limited recreation use and for the preservation of unusual plant and animal species and extraordinary habitats.

In Virginia, a report called "Critical Environmental Areas" identifies, in a preliminary way, areas of natural, scenic or historic value which contribute to economic, esthetic or cultural well-being of individuals and society. Both Maryland and Virginia have published reports that propose rivers for official Scenic River designation and stress unique scenic, fish and wildlife, and other recreation values that warrant preservation and enhancement.

These and other studies that touch on Chesapeake Bay recommend the preservation of areas primarily to meet the greatly increasing demands for outdoor recreation. They, therefore, tend to treat biotic communities only in a general way. They consider ecological preservation and

values only as a requirement for maintaining the areas in a healthy and esthetically pleasing condition. Clearly, there are many legitimate uses and values of natural areas, from camping to insect observation and from boat-landings to bird sanctuaries, but some areas need to be set aside in their natural condition and left alone. If we are to preserve the Bay's tremendous ability to produce fish, shellfish, waterfowl and other important life; to break down human sewage wastes; and to carry out its many other functions, then we also have to preserve a significant number of breeding grounds, freshwater and saltwater marshes, and other areas of ecological significance. In short, in order to maintain the valuable natural yields of the Bay, we need to assure the maintenance of the Bay's natural integrity.

Not all of the Bay can be preserved, however. Growth of industrial and residential areas will continue, as will the expansion of recreational uses of the land and water. Faced with the reality that only limited preservation is possible, the ecologists' responsibility became apparent: to point out areas which should receive the highest priority in preservation efforts. Thus, as thoroughly surveyed as the Bay had been, there remained an urgent need to determine its ecologically most important plants, animals, biotic communities and natural areas. It is urgent that such areas be evaluated and priorities set for procurement and preservation.

Recognizing this need, The Nature Conservancy and the Chesapeake Bay Foundation established a grant of \$15,000 for an ecological survey of the Bay region. In July, 1972, the Ecology Program in the

Smithsonian Institution's Office of Environmental Sciences provided matching funds and established the Smithsonian Center for Natural Areas to undertake the task.

Objectives

Briefly stated, the task was this: on the basis of a new survey, to recommend for procurement those natural areas which Smithsonian personnel judged to be of highest priority for preservation action. This in turn called for the creation of a survey concept including an evaluation system -- a concept that could function within rather narrow limits of time (two years) and expenditure, and therefore make use of already available information. Also, the system for organizing the data and ranking the areas had to be flexible, to allow for additional details as they accumulated and for changes in the landscape as they occurred. Development rarely pauses for surveys of this kind: on several occasions in the course of the study, a prime natural area would be taken out of contention by development, and we would have to erase it from our maps. Finally, the new survey concept, it was hoped, would not only provide the data necessary for decision-making in the Chesapeake Bay region but also would serve as a model for similarly motivated surveys in other regions.

Survey Concept

The survey concept includes four fairly distinct phases. (1) It was first necessary to determine and map all of the areas in the

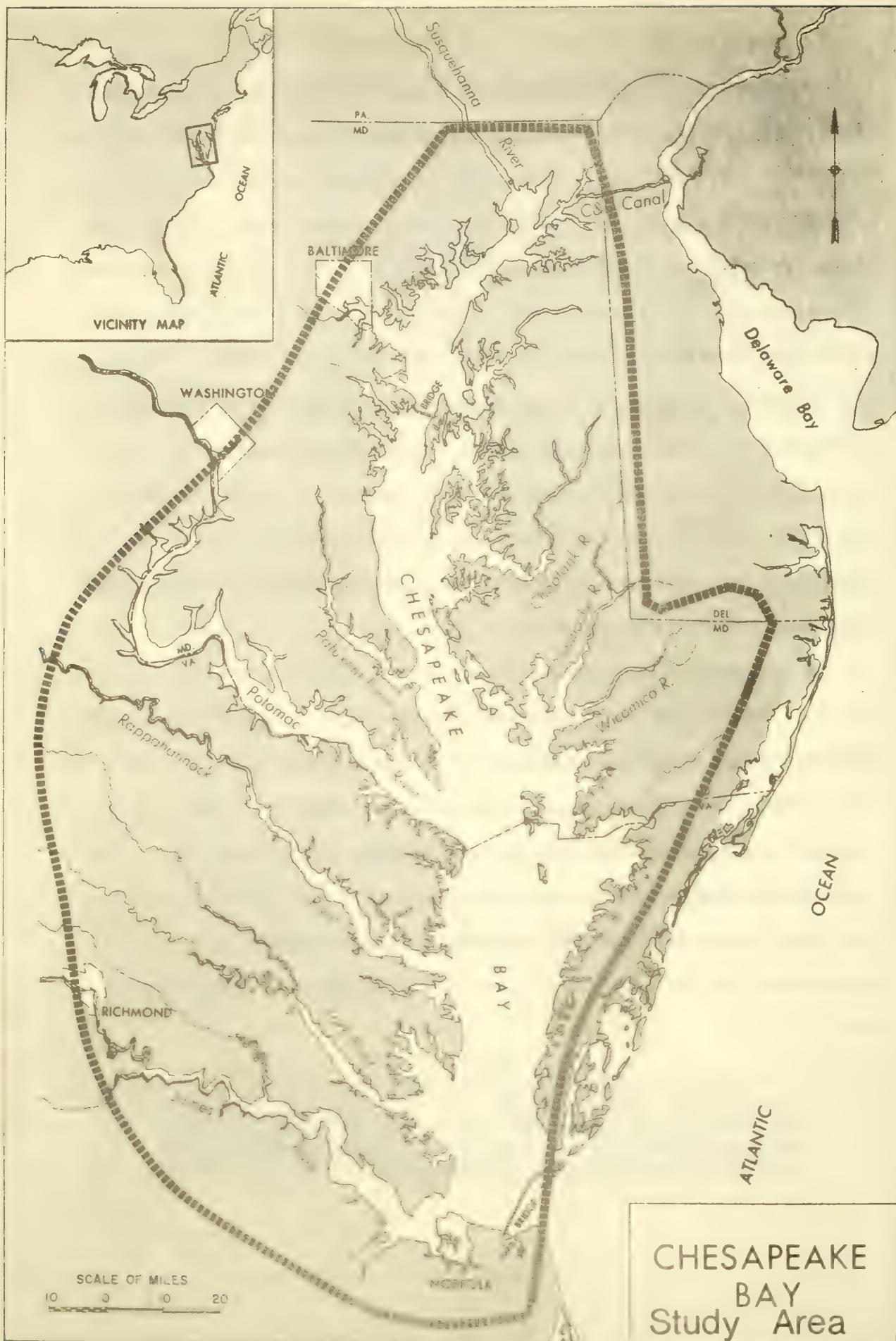
region which are presently protected from uncontrolled development and those which are properly preserved and managed as natural areas. (2)

The second phase involved determining and mapping the locations of ecologically important and significant flora, fauna, biotic communities and ecosystems. This was done on the basis of a full literature search and of existing field studies and recommendations from available sources as well as preliminary field checks of the information thus received.

(3) Selected ecological criteria were assigned numerical ratings and, by the use of overlay maps and a computerized data storage and retrieval system, all the locations noted from phase 2 were given a numerical rank. Thus, locations with the highest ecological value could be determined and proposed as the primary targets for procurement and other protective measures.

A final and crucial phase (4) was not within the scope of the contract for this study: it remains to conduct extensive field checks and feasibility studies of the proposed areas. The purpose of such fieldwork is threefold: to determine if the ecological information used in this study was accurate and up-to-date; to determine how vulnerable the proposed sites are to development and other intrusion; and to determine such matters as ownership, availability, cost of acquisition and the requirements for proper management after procurement.

NOTE: This survey should not be considered final or complete. Some prime natural areas may have been inadvertently missed which should have been included. The Center for Natural Areas welcomes any and all additional ecological information to improve its knowledge of the Bay region.



Scope of Survey

In this survey, the first three phases were accomplished including preliminary field checks on about 70 out of 232 areas, or 30 percent of the areas studied. The survey covers some 12,600 square miles (see map on page). The region includes the Chesapeake Bay drainage basin between the Pennsylvania and North Carolina state boundaries. It is bordered on the west approximately by the fall line, i.e., the line separating the coastal plain from the Piedmont area extending from Baltimore through Washington to Richmond. On the east, the boundaries include the Chesapeake Bay estuarine drainages (though not those draining to the Atlantic). Most of Delaware is excluded. While the study area includes the land adjacent to the tidal reach of the major rivers, it does not include the extensive drainage areas of the upper Potomac or Susquehanna Rivers.

Of the 12,600 square miles covered in the survey, 941 square miles were found to be in the category of 'already protected.' Some 534 square miles, in 232 separate sites, were identified as natural areas with potential need for protective action -- that is, about 4.2 percent of the total study area. Of these 232 sites, 64 have been placed in a high-priority category so that roughly 2 percent of the Bay region area is recommended for procurement or other preservation action.

Sources of Information

One of the results of this survey is an awareness on our part of the considerable amount of ecological and biological information already

available concerning the region. Our efforts have shown that in areas similarly endowed with published data, this kind of survey can be an effective means of making a rapid and inexpensive evaluation of natural areas. There are, of course, gaps in the available information -- and some of them are pointed out in the pages that follow -- but the region is blessed with much data and many individuals and organizations with considerable knowledge.

In the course of the survey, the Center for Natural Areas received invaluable data from the groups and organizations listed in Table 1.

Table 1. AGENCIES AND ORGANIZATIONS CONTACTED IN THE SURVEY

PRIVATE

American Fisheries Society
American Shore and Beach Preservation Society
Audubon Naturalist Society of the Central Atlantic States, Inc.
Audubon Society of Southern Maryland
Canoe Cruisers Association
Central Atlantic Environment Service
Chesapeake Bay Foundation
Citizens Committee on the Chesapeake Bay
Conservation Council of Virginia
Conservation Foundation, The
Federated Garden Clubs of Virginia
Garden Club of Virginia, The
Izaak Walton League (local chapters)
Junior League (local chapters)
Kent Conservation, Inc.
League of Women Voters (state chapters)
Maryland Environmental Trust
Maryland Wetlands Committee
Maryland Wildlands Committee
National Campers and Hikers Association
National Wildlife Federation (state chapters)

Nature Conservancy, The
Northern Virginia Conservation Council
Philadelphia Academy of Natural Sciences
Potomac River Association of St. Mary's County
Sierra Club (local chapters)
Talbot County Historical Society
Virginia Society of Ornithology
Wilderness Society, The
Wye Institute

MARYLAND

Maryland State Department of Natural Resources
 Department of Chesapeake Bay Affairs
 Departments of Forests and Parks
 Fish and Wildlife Administration
Maryland Natural Resources Institute
 Chesapeake Biological Lab (Solomon's Island),
 University of Maryland
Maryland State Department of Planning

VIRGINIA

Commission of Game and Inland Fisheries
Commission of Outdoor Recreation
Virginia Institute of Marine Science
Virginia State Department of Conservation and Economic Development

FEDERAL

Department of Commerce
 National Marine Fisheries Service, NOAA
Department of Defense
 Air Force
 Army (Baltimore District, Corps of Engineers)
 Navy
Department of the Interior
 U.S. Fish and Wildlife Service
 U.S. Geological Survey (and CARETS program)
 National Park Service
Smithsonian Institution
 Chesapeake Bay Center for Environmental Studies

UNIVERSITIES

American University
Georgetown University
Johns Hopkins University
Old Dominion University
University of Maryland

Several organizations, such as the Audubon Naturalist Society of the Central Atlantic States, the Chesapeake Bay Foundation, the Maryland Ornithology Society and the Virginia Society of Ornithology, assisted the project staff on a voluntary basis by soliciting information and recommendations from their members who are directly familiar with the Chesapeake Bay area. Volunteers assisted in contacting other private groups, local officials, and individuals to obtain more detailed information on specific areas.

Staff

The staff of the survey all worked part-time; the total combined effort amounted to about three man-years. The survey staff and consultants were: Dale W. Jenkins, Ph.D., Director of the Ecology Program and principal investigator. Special consultants: Anne LaBastille, Ph.D., wildlife ecologist; Richard W. Wagner, Ph.D., Ecologist; Clyde Reed, Ph.D., Botanist; Edward F. Rivinus, M.A., Ornithologist.

Mr. Stephen L. Keiley, MBA, Director of the Center for Natural Areas. Fonda R. Hivick, M.A., Botanist, Russell Kologiski, B.S., Botanist, and Gary S. Waggoner, M.A., Ecologist, were involved in data gathering and evaluation. Interpretation and cartography were completed by Luis Calvo, Cartographer; David Kunhardt, B.A., Administrative Assistant; Bryan Thompson, MLA, Landscape Architecture; David Vreeland, B.S., Geographer, and J. Copperidge Wilson, B.S., Zoologist. Secretarial and clerical: Fay Davis, Willa Afshar, Karan Shaffer, Mary Kadziel.

II. PRESENTLY PROTECTED AND PRESERVED LANDS

About 941 square miles or over one-half million acres (just over 240,000 hectares) of land is presently protected in the Chesapeake Bay region by virtue of being owned either privately or by the federal or state governments. These lands may be subject to a variety of human activities from landing airplanes to lumbering, fishing, hunting or intense recreational uses. So, while they are not subject to unplanned, market-dominated real estate development, they are also not necessarily preserved in any true sense. In our opinion, these lands should be analyzed in greater depth and ranked according to the ecological criteria set forth in this report. Those found of prime value should then be so designated and action should be taken to change their management status to assure their protection in perpetuity. Such an analysis was not within the scope of this survey, on the grounds that these lands are, at the very least, protected from development and thus not as threatened as the others that formed the bulk of the survey.

A number of areas within the region are preserved, in the sense that damaging use or development is largely ruled out. These include seven National Wildlife Refuges plus seventeen other areas, some of them state parks or refuges and others being privately owned, (and listed in published reports as natural areas, research natural areas or natural landmarks).

None of these protected or preserved areas were actively investigated by us. They were, however, depicted on a 1:250,000 scale map with appropriate coding to show different categories of ownership and

management. This information is summarized in Table 2 and explained in the text which follows. It is interesting to note that already protected and preserved land in the region amounts to 7.5% of the entire study area. For a detailed listing of all these areas, consult Appendix E.

TABLE 2. PRESENTLY PROTECTED AREAS OF CHESAPEAKE BAY

<u>Ownership</u>	<u>Number of Sites</u>	<u>Acres</u>	<u>Hectares</u> ¹
FEDERAL			
Military	43	266,000	107,500
National Wildlife Refuges ²	8	32,400	13,100
Other	20	56,200	22,700
STATE			
Forests	5	20,750	8,380
Parks	36	56,760	22,930
Wildlife Management Areas ³	30	78,700	31,800
Other	26	80,600	32,570
PRIVATE OR QUASI-PUBLIC	8	10,770	4,350
Total	602,200	243,300	

¹The hectare is a unit of area in the metric system. One hectare equals 10,000 square meters or 2.471 acres. There are approximately 258 hectares per square mile.

²Includes some land not in the N.W.R. system but administered by the U. S. Department of Interior's Bureau of Sport Fisheries and Wildlife.

³Includes some land not in the W.M.A. systems but held with identical management practices. Also includes Virginia Natural Areas.

Protected Federal Lands

Military Lands. The Department of Defense has more public protected land in the Bay region than other Federal agencies. Topographic maps show that much military land is undeveloped forests, marshlands, and shorelines. Nine of the forty-three reservations and installations listed below contain or are directly adjacent to what we later determined to be valuable natural areas:

Name	Location	Hectares
Aberdeen Proving Grounds (Army)	Harford Co., Md.	13,445
Fort George G. Meade (Army)	Anne Arundel Co., Md.	5,252
Navy Propellant Plant	Charles Co., Md.	889
Cedar Neck Naval Research Lab	Charles, Md.	566
Fort Belvoir (Army)	Fairfax, Va.	2,707
Dahlgren Weapons Lab (Navy)	King George, Va.	1,495
Fort Eustis Military Reservation	Newport News City, Va.	2,304
Plum Tree Island Bombing Range	York, Va.	1,212
U. S. Navy Transmitter Station	Nansemond Co., Va.	323
		28,193

Four reservations enclose more than two-thirds of the total military acreage in the Bay region with a diversity of land-use potential:

Name	Location	Hectares
Aberdeen Proving Grounds (Army)	Harford Co., Md.	13,445
Fort George G. Meade (Army)	Anne Arundel Co., Md.	5,252
Quantico Marine Corps Schools	Prince William & Stafford Co's., Va.	25,048
A. P. Hill Military Reservation	Caroline	28,967
		72,712

Public hunting and fishing is allowed in parts of some areas, such as Quantico and A. P. Hill reservations. The Department of Defense has created directives for the use of land and the services have shown an increasing sensitivity to ecological concerns (as evidenced by the Air Force effort to set ecologically sound management practices at their bases).

National Wildlife Refuges and Bureau of Sport Fisheries and Wildlife Land. Seven National Wildlife Refuges (N.W.R.) are in somewhat remote and naturally well-protected locations in the Bay. An eighth area was designated by both the Society of American Foresters and the Federal Committee on Research Natural Areas as a valuable natural area: the Patuxent Wildlife Research Center. These refuges constitute some of the better protected natural areas in the Bay.

Name	Location	Hectares
Susquehanna N.W.R.	Harford Co., Md.	1.5 land 4,050 water
Eastern Neck N.W.R.	Kent Co., Md.	923
Blackwater N.W.R.	Dorchester Co., Md.	4,531
Martin N.W.R.	Somerset Co., Md.	1,786
Patuxent Wildlife Research Center	Anne Arundel & Prince George's Co., Md.	287
Mason Neck N.W.R.	Fairfax Co., Va.	580
Presquile N.W.R.	Chesterfield	536
Fisherman's Island N.W.R.	Northampton Co., Va.	404
		13,100

Other Federally-Owned and Administered Open Space. This class of land includes National Parks, a National Forest, and various other Federal areas. The parks range from the 3,810-hectare Colonial National

Historical Park of James City, Virginia, to the 35.5-hectare Theodore Roosevelt Island Memorial Park in the Potomac River at Washington, D. C. The fifteen parks have a total of approximately 9,211 hectares. Three of the parks, Theodore Roosevelt Island, the George Washington Memorial Parkway, and Colonial National Historical Park, contain marshland that is considered valuable natural land. Their prime function, however, is for tourists who seek historical and recreational establishments; conservation regulations are limited.

The Prince William Forest Park in Prince William County, Virginia is the only National Forest in the region. It covers 7,353 hectares and has moderate recreational use.

Other federal lands include the U. S. Department of Agriculture Research Station in Prince George's County which has over 3,878 hectares of land; and the Pamunkey Indian Reservation in King William County, Virginia which includes valuable wetlands and wildlife in its 404 hectares.

Protected State and Local Lands

State Forests. Five state forests in the Bay region in Maryland total approximately 8,400 hectares. The largest is the new and still growing Pocomoke State Forest in Worcester County. It has 5,600 hectares of land along and near the Pocomoke River. The state has designated the Pocomoke a Scenic River, and will expand forests and local parks along its banks. These state forests enjoy good protection with some restrictions on their use, but their numbers are few and none has been

established near the Bay in Virginia. The proper officials in each state should be contacted to ascertain state plans for further use and development of the forest systems.

State, local and regional parks. The park system in each state administers various historical, recreational and natural lands of several types. This category probably contains the widest variety of land uses. Only in the last five or six years has there been an official recognition of the need to preserve certain sites as Natural Areas rather than as recreation sites or camping grounds. Of the 20,000 hectares of parkland in 36 parks, we recommend that approximately 3,500 hectares within the following seven parks should be maintained in their natural state. More details of the sites recommended are shown on marked topographic maps in the Center for Natural Areas.

Name	Location	Hectares
Susquehanna State Park	Harford Co., Md.	646
Severn Run Natural Envir. Area	Anne Arundel Co., Md.	640
Wye Oak State Park	Talbot Co., Md.	9
Patuxent River State Park	Prince George's Co., Md.	1,212
Shad Landing State Park	Worcester Co., Md.	220
Chippokes Plantation State Park	Surry Co., Va.	404
Seashore State Park	Virginia Beach Co., Va.	1,050
		4,181

Wildlife Management Areas. The State of Maryland has 20,000 hectares of Bay region land in its Wildlife Management System. The Commonwealth of Virginia, in both its Wildlife Management-/and Natural-Areas Systems, has 3,393 hectares in the Bay region. These systems include some lands not owned by the states but administered by them

under easement agreements. Public hunting is allowed in regulated seasons. In this category are some of the very large prime wetlands of the Eastern Shore of the Bay (some 14,000 hectares on the shore of four counties). These areas are more isolated and less used than the majority of the parks: most if not all of them can be considered valuable potential natural areas.

Other State, Regional and Local Lands. About 13,770 hectares of land and water have been categorized as undeveloped land. The greater part of this area, 10,630 hectares, consists of state and city reservoirs. Among the remainder are four tracts containing interesting natural areas:

Name	Location	Hectares
Crownsville State Hospital	Anne Arundel Co., Md.	384
Eastern State Hospital Reservation	James City Co., Va.	202
Salt Ponds and Northend Point Natural Preserve	Hampton City, Va.	303
Elko Tract	Henrico Co., Va.	808
		1,697

Private and Quasi-Public Properties. Privately protected lands, conservation easements, and holdings by small conservation-minded groups are not all compiled here. The Chesapeake Bay lands of the Nature Conservancy and the Smithsonian Institution are plotted on map 1. The Nature Conservancy's lands are well protected natural areas. Two properties which might be considered as preserves because of their prime natural value are:

Name	Location	Hectares
Camp Rodney Scout Reservation	Cecil Co., Md.	414
Belt Woods (The Episcopal Church)	Prince George's Co., Md.	16
430		

Belt Woods has been nominated by the Center to receive Registered Natural Landmark status from the National Park Service because of its unique stand of mature hardwoods and large bird population.

Preserved Natural Areas

The designation of preserved natural areas is difficult when dealing with state-owned lands since there are different types of preservation and protection. State and federal forests preserve flora and fauna but are subject to cutting, management and "multiple use." State and federal parks have much human use and are subject to management and partial development for recreation. The status of state and Federal wildlife management areas and refuges also varies inasmuch as they preserve wildlife and flora but are subject to changing management policies.

There are 17 sites which may be considered as designated natural areas, but this list should be considered as very tentative since some of the areas may not qualify as fully preserved natural areas.

The Nature Conservancy sites, the Natural Landmark areas, and the Smithsonian Institution areas can be considered as preserved natural areas. The State of Virginia has designated three natural areas--Charles C. Steirly Natural Area, Parkers Marsh Natural Area, and Seashore Natural Area and these are fully preserved. The latter is also a state park with some tourist facilities and use.

TABLE 3. PRESERVED NATURAL AREAS

	<u>Size of Area (Hectares)</u>	<u>Owner</u>	<u>Type of Area</u>	<u>Preservation</u>
Hellen Creek Hemlock Preserve, Md.	36	Nature Conserv.	Hemlock Outlier	Good
Alexander Berger Memorial Sanctuary, Va.	346	"	Diverse Veg. & Wildlife	Good
Hambleton Island	11	"	Virgin Cedar & Pine	Good
Battle Creek Cypress Swamp, Md.	40	"	Cypress Outlier	Good; Landmark
Charles C. Steirly Natural Area, Va.	8	State of Virginia	Cypress & Tupelo	Good
Long Green Creek Valley and Sweathouse Branch, Md.	101	State of Md. Park	Forests and Rivers	Good
Belt Woods, Md.	16	Episcopal Church	Virgin Mature Forest	Proposed Landmark
Parkers Marsh Natural Area, Va.	307	State of Virginia	Tidal Marsh	Good
Patuxent River Wildlife Research Center, Md.	286	BSFW	Forests and Wildlife	Good; SAF Area
Seashore Natural Area, Va.	606	Va. State Park	Dunes and Forests	Good; Landmark
Mill Creek Bird Sanctuary, Md.	62	Quasi-Public	Oak-Pine Forest	Good
Hock Tract, Md.	6	Md. State Road Com.	Virgin Forest	Good
Corcoran Tract (Part of Sandy Point State Park), Md.	56	Md. State Forest & Pk.	Virgin Oak & Pine	Good
Smithsonian Chesapeake Bay Center for Environmental Studies, Md.	808	Smithsonian Institution	Forests & Marshes	Good
LeCompte Bryant Fox Squirrel Refuge, Md.	137	Md. Dept. Game & Fish	Hardwood & Softwood	Good
Pocomoke River Swamp, Md. (over 7,000 ha.)	202	Quasi-Public & State	Cypress & Cedar Swamp	Partly Preserved
Poplar Island, Jefferson and Coaches Islands, Md.	50	Smithsonian Institution	Forest & Marshes	Good
Total	3,078			

III. DEFINING THE NATURAL AREAS

To a slum-dweller a natural area could be a quarter-acre park; to an accomplished hiker, the term might not be served by anything less than a 1,000 square-mile primeval wilderness. As varied as the definitions of 'natural area' are the uses to which humans put such areas. For the purposes of this survey, a rather stringent definition was assumed, for the task was to identify natural areas with demonstrable, intrinsic ecological value.

Under such stringent definition, as we were well aware, many valuable features of the landscape are omitted from consideration. No definition of an ecosystem can escape the fact that an ecosystem is not a self-contained unit with definable limits. Plant life, for example, depends on a host of features--geological, climatic and so forth. And geologists may well find their most valued areas given short shrift in this survey. Archeologists and historians, as well as recreation planners, certainly will.

The definition of a natural area to be judged in this survey is: an area of land or water where natural ecosystem processes operate relatively undisturbed and where natural biological communities, their interactions, structures and functions can be studied. This is somewhat more restrictive a definition than that used by the "Catalog of Natural Areas in Maryland" published by that state's planning department. It is more precise, though not necessarily more to the point, than another definition of natural areas: "That which is His, not ours."

Altogether, using the ecological criteria outlined in this section, the survey identified 232 sites to be considered natural areas--a total potential land area of 138,319 hectares, or 4.2% of the entire study area.

The major types of natural areas of the Bay region are as follows:

a. Primeval Area. Areas which preserve examples of significant species of plants and animals. These wilderness areas should remain natural and unchanged by direct human influences, except in cases of successional communities which may require management to maintain them. They may have limited monitoring as remote "primitive" or "benchmark" areas.

b. Gene Pool Preserve. Special preserves for rare and endangered species of plants and animals requiring complete protection and, often, surrounding buffer zones.

c. Research Natural Area. Ecological research areas where natural processes are allowed to predominate and which are preserved primarily for research. Human use and collection is limited and non-destructive. They can also be used as "benchmark," "baseline," or "check" areas for monitoring environmental change.

d. Manipulative Research Area. Areas where research may modify an area to understand its function and permit better ecological prediction and management.

e. Educational Natural Area. Areas used to teach students and the public, and which may be used for minor research projects. Some development of human facilities and trails or access routes are usually needed.

The management of such natural areas would, as implied above, vary with the type, use and value of the area in question. The uses and values are several, and include:

Esthetic enjoyment. There is ultimately an esthetic value that urges the preservation of the best examples of the various types of plant and animal communities. Beyond that, one can say without being didactic that preserving such examples can only improve the national conscience and thus help prevent the mindless destruction of this part of our national heritage for future generations.

Baseline and long-term monitoring of environmental quality. Natural areas allow collection of essential baseline monitoring data to study trends and changes in populations, levels of pollutants and the effects of man's disturbance.

Study of the structure and function of natural ecosystems. Rational decisions on development and management of our environment depend on theoretical understanding of the natural environment. Integrated systems analysis and development of ecological models require detailed studies of natural areas to develop a predictive ecological capability.

Preservation of germ plasm reservoirs, gene pools, and endangered species. Natural areas preserve the genetic stock of organisms needed by man for new or improved strains of economic and survival value to society in agriculture, horticulture, silviculture, mariculture, medicine and other areas. Rapid

development and change of the world requires use of new strains of species with different adaptations. Threatened endangered species and natural communities once lost are gone forevermore.

Educational and training value. Natural areas are outdoor laboratories for complex research investigation as well as living museums where students and the public can observe nature first-hand. In some natural areas, manipulation of the environment is studied to show the impact of man's technology.

Contribution to environmental quality. Natural areas may act as ecological buffers to modulate the environment, helping in flood control, aquifer recharge and breeding areas for hunting, sport, and commercially important organisms. Natural areas maintain an environment which supports diversity and variety of individual choices.

When faced with the urgent need to make choices, one must choose with a combination of whatever scientific information and experiential judgment is available and thus decide what are the salient features to emphasize. The word 'value' has been used often in this report and it will be used many times again. The values of the Center for Natural Areas are, at the very least, implicit in what follows.

There is an enormous amount of accumulated information about the Chesapeake Bay Region--in scientific and popular literature, from unpublished sources such as knowledgeable biologists and conservationists, and from the biological collections of various

museums. It is altogether likely that some of this information is outdated, given the rapid rate of habitat modification taking place in the region, and ideally all this information should be rechecked, especially in the case of data about wetlands, coastal areas and islands.

At the same time, from the standpoint of making an ecological survey, there are great gaps in our knowledge. It is not always known, for example, what the correlation is between plant communities of various sorts and the niches of some animals, especially migratory ones. Nor is it always known what the tolerances of various plants and animals are to various changes in environmental quality. Faced with such gaps, the Center for Natural Areas was forced to rely on several traditional sets of parameters in classifying and ranking the natural areas of this vast region.

Important Biotic Communities

No natural ecosystem, even a simplified version such as a plant community, is discreet. All are bounded by gradients (ecotones) where the species characteristic of one habitat are gradually replaced by those of another. At its upper edge a salt marsh merges into a freshwater marsh which in turn passes without break into the forest on its edge. Only men make maps with lines on them, but such map lines—and categories—are necessary. The Chesapeake Bay region is rich in the categories of biotic

communities and, as distinctive communities, each type takes on an ecological value based on abundance, diversity, productivity, and other factors described later.

What follows is a brief taxonomy of the region's key ecosystems. The typical plants present in each ecosystem are mentioned, along with associated animals. Appendix B gives a more complete description of each ecosystem type, with more varieties of plants and animals, including the scientific nomenclature.

Salt Marsh or Brackish Tidal Marsh. This type of biotic community is flooded periodically, the period depending on the elevation of the marsh. The classic low marsh, flooded twice daily, is characterized by the ecologically important salt-marsh cordgrass, which serves as a base for many complex foodchains. The frequency of low marsh increases from north south in the Bay, particularly on the eastern shore. The flushing action of the tides is essential to the low marsh community, bringing in both fishes and nutrients and flushing out wastes. Tidal creeks meander through the salt marsh, rich in silt and organic debris from inland runoff, which provide additional nutrient supply.

High salt marsh is flooded only irregularly, and is composed of associations of grasses, rushes and sedges such as salt grass, saltmeadow cordgrass, black needlerush, glasswort, etc. Typical animals of both low and high salt marshes include: horseshoe, fiddler and marsh crabs; several species of snails, mussels and snakes; mallard, pintail and black ducks; sparrows, hawks and

herons; opossum, shrews, voles, rats, raccoons, and many other animals.

Freshwater Marsh. While freshwater marshes are more abundant toward the head of the Bay where the water is virtually fresh, they are also found upstream in almost every tributary stream in the Bay. A great diversity of plants is distributed in these marshes in response to variations in depth of water and salinity. The most important representative species include three-square, cattail, wild rice, common reed, and arrowhead. Also often occurring are varieties of rushes, sedges, and alder.

Corresponding with the high diversity of plant life, there is also a high diversity of animal life, including: salamanders, toads, many varieties of frogs, turtles, and snakes; herons, mallards, bald eagles, hawks and osprey; moles, beaver, muskrat and fox.

Bogs. Rather limited in size and distribution, bogs differ significantly from swamps and marshes. Bogs are so acid that biomass accumulates in their basins in the form of peat rather than decomposing and being recycled in the system as is more often the case in marshes and swamps. Bogs have a cushion-like surface layer of vegetation dominated by mosses. Also found is buckbean, cotton grass, numerous sedges, cranberry, and bog rosemary. A variety of unusual plants are found in bogs, including pitcher plant, baldderworts, orchids, sundews, and highbush blueberry. It is not unusual to find certain pine, maple and gum trees in and around bogs. The animal species of

bogs would generally be those of the surrounding ecosystems, such as quail, turkey, woodcock and warbler. One rare species found here would be the bog turtle.

Ponds. Both fresh- and saltwater ponds occur in the region. Salt ponds contain many of the species found in shallow marine habitats, but ditch grass is most characteristic. Freshwater ponds have a wide range of species: submerged aquatics such as tape grass, water milfoil, and bladderwort, and emergent species including arrowhead and pickerel weed.

Cypress-Gum Swamp Forest. The distribution of the Cypress-Gum Swamp Forest reaches its northern limits in the Chesapeake Bay region, where some of the species typical of the Bottomland Hardwood Forest give way in deeper water to the dominance of the baldcypress and the water tupelo. Typical animals include such birds as the double crested cormorant, the common egret, black crowned night heron, red shouldered hawk, barred owl, and pileated woodpecker. Such mammals as the gray fox, raccoon, mink, river otter, and even the black bear, bobcat and white-tailed deer also appear.

Bottomland Hardwood Forest. This community type is one of the most diverse terrestrial plant communities in the Atlantic Coastal Plain. It occupies the floodplains of the major rivers, and is often flooded in winter and spring with either lower water levels or no standing water in summer and fall. The vegetation is mostly trees with some shrubs and vines. The hardwoods in swamp

forests are black gum, red maple, tupelo, swamp poplar, various oaks, sweet gum, and sweet bay. The more mature bottomland forests may have beech, oaks and elms. In the smaller floodplains of the northern sections of the Bay, the dominant species are: beech, river birch, sycamore, box elder, and silver maple.

Animal species are also quite abundant in bottomland forests, due to the presence of a large supply of foods. Typical animals include: salamanders, toads, frogs, turtles, snakes, ducks, hawk, turkey, woodcock, woodpeckers, warblers, and cardinals. The list of mammals occurring here is much the same as those of the cypress-gum swamp forest, and should also include the opossum, eastern cottontail, squirrels, and beaver.

Pine Flatwoods. Loblolly and pitch pine dominate the coastal flatwoods, with loblolly pine particularly important in Virginia and pitch pine dominant in Maryland. The pine flatwoods are generally rather open with an incomplete canopy, and often have a diverse shrub and herb zone. These forests may be successional, and thus will eventually be naturally replaced by an upland hardwood forest. Some frequently found animals are the pine woods tree frog, fence lizard, cornsnake, hawks, quail, several woodpecker varieties, the pine warbler, pine woods sparrow, meadowlark, towhee, and pine mouse.

Upland Hardwood Forest. This is the climax forest of the upland parts of the region, and is dominated by various species of oak. Other mixed hardwoods including blackgum, hickories,

beech, sweetgum, magnolia and dogwood, are found in the uplands. Animals of the upland hardwood forest range from several species of salamander, skink and snake to the long-tailed weasel and the striped skunk. Birds typically found include hawks, owls, and woodpeckers, the ruby throated hummingbird, flycatchers, crows, jays, warblers, and vireos. Mammals commonly occurring are shrews, voles, mice, chipmunks, squirrels, raccoon, and deer.

Old Field Community. This is a very common community type which develops on abandoned lands, particularly agricultural lands. Many species of grasses, wildflowers, weeds, vines and briars are among the first to invade old fields. Next to arrive are plants like broomsedge, which can completely dominate the community within a few years. Not long after, sweetgum and pines begin to grow, and the old field can progress into a pine forest or eventually a hardwood forest. Common animal species found during the early stages of old field succession are savanna-, grasshopper- and field sparrows, and snakes and hawks which feed on the shrews, moles, voles, and mice which are so prevalent.

Dune Communities, Maritime Shrub Thickets, and Maritime Forests occur in the Chesapeake Bay region, but mostly on the Atlantic side of the DelMarVa peninsula and they are therefore not included in this study.

Rare and Endangered Animals

Many of our plant and animal species are being destroyed by man's developmental activities, by overgrazing, fire, introduced exotic species and diseases, and particularly destruction of habitats. Some of these species are of national significance, some are important as gene pools for food and fiber producers, as pharmaceuticals, or are of unknown potential use to humans. For many species, preservation of critical habitats as natural areas is sufficient to preserve the species from extinction. Other species require special laws to prevent hunting, picking or collecting.

At present, the species of endangered vertebrate animals are fairly well known. The enormous numbers of invertebrate animal species are less known and many have not even been described to science and have completely unknown status. (Certain species of endangered molluscs, butterflies, and a few other groups of invertebrates are presently fairly well known.) Most preservation efforts for endangered animal species are limited to the relatively small number of the larger and more obvious and interesting species. People tend to identify with vertebrates more than with invertebrates; they even choose them as symbols.

In the Chesapeake Bay region there are at least four species of vertebrate animals that are rare or endangered. This includes the southern bald eagle, the DelMarVa fox squirrel, the Maryland darter and the bog turtle. They are discussed below along with the osprey which is rapidly declining, but not yet in the endangered category.

The southern bald eagle (Haliaeetus leucocephalus leucocephalus) was once very abundant in the Chesapeake Bay region. In 1936 there were over 250 active nests throughout the Delaware, Virginia and Maryland areas. Today, around 90 nests, not all active in any given year, can be found in the same area. Not only have the number of nesting eagles declined but there has been a shift from the upper parts of rivers and the northern part of the Bay to the estuarine segments of the rivers and the southern bay. Despite pesticide-induced shell thinning (recorded for a number of birds of prey including fish predators such as the cormorant and brown pelican), the major cause of eagle mortality continues to be shooting, pollution of feeding areas, and loss of habitat to various forms of development). Even though the eagle population has declined by at least 60% in the last 10 years, the Chesapeake Bay region is the most productive area north of Florida for southern subspecies of bald eagle. The prognosis is not good, however, since the reproductive rate, 5-35%, is considerably below that necessary for a stable population.

The DelMarVa fox squirrel, also known as the Bryant fox squirrel (Sciurus niger cinereus), is a subspecies of the more widespread eastern fox squirrel. Never very abundant or widespread in its range, the DelMarVa fox squirrel is confined today to four eastern shore counties in Maryland: Kent, Queen Anne, Talbot, and Dorchester. The population apparently lies somewhere between 500 and 1500 individuals. Although protected in Maryland since 1971, this species is easily confused with the more abundant eastern gray squirrel Sciurus

carolinensis and many are probably killed during the hunting season. Continued reduction of habitat by real estate developments and cutting of the old-aged, mixed pine-hardwood stands which are the prime habitat, have doubtless contributed to population decline as well.

The Maryland darter (Etheostoma sellare) is a small and rather nondescript fish found in only two streams, Deer Creek and the east branch of Swan Creek, both tributaries of the Susquehanna in Harford County, Maryland. While the population size is unknown, it is assumed because of the very limited habitat to be rather small. Since the species appears to be endemic at the periphery of the range of its closest relatives, it has not been abundant for rather a long time.

The bog turtle (Clemmys muhlenbergi) as its name suggests, is limited to wetland areas in the northeast and the southern Appalachians. Because of its rather secretive behavior its numbers are difficult to determine. Its decline can be inferred both from the destruction of its rather limited habitat and the high value placed on it by pet shops because of its scarcity. It has been protected in Maryland, the only state in the Bay region where it occurs, since 1972.

The osprey (Pandion haliaetus) is not an endangered species, but populations are declining in many places along the east coast -- an example of a rare, declining, or depleted species. Annual production to guarantee replacement for a stable population has been estimated at between 0.95 and 1.30 young fledged per breeding female. In only a few parts of the Bay is this figure reached every year. Despite

the decline, the Bay region has the highest concentration of nesting osprey in the United States -- roughly estimated at 1400 pairs in 1972 and 1100 in 1973. Reasons for the decline, where observed, seem similar to those responsible for the southern bald eagle decline.

The abundance and distribution of most invertebrate animal species is in general poorly known except for certain pests or commercially important species. The Washington, D. C. area has been the site of extensive biological study so that many type localities exist where species have been described. For many species, this is the only known information as the species may never have been collected again. It is important to determine the rarity or endangered status of these species with specialized field studies.

Two species of rare and endangered crustacea are known from the Chesapeake Bay region:

Hay's Spring scud (Stygonectes hayi) is a blind white crustacean known only from a single spring in Washington, D. C. and threatened by urbanization and groundwater pollution. Once widespread, it is now greatly restricted in habitat and has been extensively looked for in recent years.

The Tidewater scud (Stygonectes indentatus), a unique interstitial crustacean, is limited to several groundwater seeps in Nansemond County, Virginia, and is threatened by groundwater pollution throughout its range and by suburban sprawl. It is a primitive member of the genus and is believed to live in the ancestral habitat that once was

characteristic of the genus. It has been sought but not found elsewhere in the tidewater area.

Rare and Endangered Plants

The rare and endangered plants of the Chesapeake Bay region had never been compiled before this survey and no list existed. Plant distribution and abundance is much less known (except for certain trees) than for vertebrate animals. Many plant records are from old records in herbaria, often with vague locality dat , and the plant species may no longer exist.

Major disruption of habitats due to agriculture, lumbering, and introduction of exotic weeds has resulted in enormous changes, driving many species close to extinction.

An extensive survey of the literature, consulting with specialists, and examination of herbaria (U. S. National Museum of Natural History, Harvard Gray Herbarium, Clyde Reed Herbarium) resulted in a preliminary list of 23 species of plants which are reported to be rare and endemic. Of these, about 15 species may be considered endangered. The total population of the local and endemic seaside alder (Alnus maritima) occurs in only four counties in the Bay area, but it is not endangered or threatened.

Much more field work and collecting is necessary to validate the exact present status of each species of rare and restricted plant. Extensive field work is required to prove whether or not certain plant species have become extinct.

Range Phenomena

Plant and animal species usually have distinct areas where the major populations occur. But at the edges of the range there may be outliers or disjunct populations which may have developed taxonomic or other differences if they have been isolated for some time. They may include both new endemic or old relict populations of scientific importance and often need protection. At the edges of ranges, species may be rare and require protection.

Because of its position halfway up the Atlantic Coastal Plain, the Bay region includes many edges of ranges or outlying disjunct populations.

Northern Limit. Many species with an essentially southern distribution extend into the Bay region; e.g., longleaf pine (Pinus palustris) and water tupelo (Nyssa aquatica).

Northern Outlier. Some southern species have disjunct populations, often just a few individuals, well north of the contiguous populations: e.g., bald cypress (Taxodium distichum), water hickory (Carya aquatica), overcup oak (Quercus lyrata), and live oak (Quercus virginiana).

Southern Limit. Essentially northern species whose southernmost distribution extends into the Bay region: e.g., black ash (Fraxinus nigra).

Southern Outlier. Populations in the Bay region that are disjunct from the southern continuous populations to the north: e.g., balsam poplar (Populus balsamifera).

Eastern Outlier. Species whose distribution is primarily midwestern extend eastward as disjunct outliers: e.g. chinkapin oak (Quercus muehlenbergii), shumard oak (Quercus shumardi), and bur oak (Quercus macrocarpa).

Coastal Plain Outlier. Upland species characteristic of the Appalachians are occasionally found in small colonies deep in the coastal plain over a hundred miles from the nearest upland population; e.g., white pine (Pinus strobus), hemlock (Tsuga canadensis), and rhododendron (Rhododendron maximum).

Regardless of their nature, these populations are of far greater importance than as mere geographical curiosities. Any organisms living on the edge of its range is operating at the limit of its adaptation to its environment as well, and it may be particularly sensitive to environmental stresses with which it can cope in the center of the range. If we are to understand the ecological amplitude of any species, it must be studied under extreme conditions as well as optimal ones. For this reason, a few acres of scraggly hemlocks on the eastern shore may be worth a hundred acres on the Blue Ridge. These range phenomena have been located as precisely

as records allow, and they enter importantly into the natural area selection process.

Various species are restricted or endemic to the region and are of particular ecological significance. Most of these endemic species are rare and endangered. Some endemic species such as seaside alder (Alnus maritima) are restricted and local, but not yet in the category of endangered or threatened. If these species are locally exterminated, it will result in the worldwide loss of the species.

Seasonal Concentration of Animals

While endangered, rare, and uncommon species are critically important and figure strongly in the selection of desirable natural areas, the most striking feature of Bay wildlife is the seasonal concentration of various species. There are three major groups: overwintering species, seasonal breeders, and migratory stopovers.

Overwintering Species. Many Bay area residents, hunters or not, eagerly look forward to the October arrival of noisy skeins of geese and ducks followed later by whistling swans. By April, the old-squaw, canvasback, mergansers, Canada geese, and swans have returned to their northern breeding places, but their economic and ecologic impact is considerable. Unlike the endangered species which tend to stay put, overwintering species frequently move about on their overwintering grounds and have even adapted new habits as old food supplies disappear and new ones appear.

The swan, Cygnus columbianus, which as recently as a few years ago fed offshore in shallow water while the less wary geese flew inland to feed on stubble fields, have now begun to emulate the habits of geese and can be seen in flocks of several hundred on fields far from open water.. This may be due in part to a decrease in the supply of food offshore resulting from increased turbidity and pollution. Nevertheless, it is difficult to anticipate in which bay or river the overwintering species will concentrate from year to year.

Setting aside natural areas to accommodate overwintering species is not practical unless the areas are specifically managed for waterfowl, and such management may then interfere with other uses or values of a given area. Even so, unusual concentrations of overwintering waterfowl have been noted and considered as a criterion for natural areas selection.

Seasonal Breeders. Various species of animals concentrate in certain areas to reproduce. This is particularly true of many migratory species of birds and fish and for some mammals and amphibia. Birds nesting in certain areas, e.g., heronries and sea bird nesting sites, may result in very high seasonal populations. Spawning fish, especially anadromous species, concentrate in selected areas during reproduction periods. In Chesapeake Bay, striped bass (Morone saxatilis), herring (Alosa aestivalis), hickory shad (Alosa mediocris), white shad and American shad (Alosa sapidissima) ascend freshwater streams to breed, many in

large enough quantities to be of commercial value. The striped bass is of course a highly regarded sport fish as well. The importance of small tributary streams as breeding areas and their attendant marshes as nurseries for the subsequent fry has been considered in assessing natural area value.

Wood duck nesting concentrations have been noted (in the study's computer print-out) where information was available. This species, considered endangered 30-40 years ago, has made an astonishing come-back. The wood duck (Aix sponsa) declined as the old trees which had proper nesting cavities were logged off and younger trees cut before reaching proper size. Artificial nesting sites have helped the wood duck to become relatively common again. Since the male is one of the most beautifully marked birds in North American, nesting data was included in the natural areas evaluations.

Heronries are present in the Bay region, mostly of the great blue heron (Ardea herodias) but other types of heronries are found too -- green heron (Butorides virescens), black-crowned night heron (Nyctocorax nycticorax), and American egret (Casmerodium albus). At the present about 30 active heronries have been plotted on Map 2, although others probably exist.

Migratory stopovers. Certain areas such as peninsulas and islands are utilized by shorebirds, birds of prey, and passerines passing north or south during migrations. The birds pause to feed and rest for a few days before resuming their migratory flights.

Whenever possible, such areas were located and considered in selecting natural areas.

Commercial Game and Unusual Animal Populations

It is important to provide protected areas for wild game, fish, and shellfish where the populations are protected from over-exploitation. These areas should include breeding areas where populations can build up in sufficient numbers to supply the populations required for commercial or sport hunting and fishing. Game refuges and wildlife management areas are examples of this concept. However, a wider distribution of more areas with different habitats will insure larger and more widespread populations than the relatively few larger wildlife refuges. This is particularly important for certain non-game species.

These protected natural areas are necessary for preservation of many fur bearing animals of interest such as otter, beaver, mink, bobcat, bear, fox and other animals which most humans are happy to occasionally observe in the wild and to know that they still exist. These animals plus deer are rarely seen by the average person.

The high point of many vacationers is to have observed some of these animals in the wild. Preservation of natural areas assures more abundant populations of these animals. A natural area next to a park or recreation area enhances the park greatly.

Clam and oyster beds are quite intimately related to both the bay or estuary where they are located and the nearby marshes which provide the production which the shellfish, in part, harvest. Shellfish are sessile as adults and are quite sensitive to siltation. Some species such as oysters (Crassostrea virginica) lack the siphon that permits clams to be buried by silt. Clams are also dependent on detritus from marshes for food, especially in the younger stages. Adult crabs (Callinectes sapidus) may feed in turn on smaller detritus feeders. Although crabs are quite mobile and migrate during the winter into deeper water near the mouth of the Bay, their attraction to certain areas in the summer reflects the high productivity of those areas. These places should be identified wherever possible as well as oyster bars and clam beds.

Paleontological Features

Fossils, mostly of Miocene age (25,000,000 years before present), are abundant in many exposed Bay front areas: Calvert Cliffs is probably the best known example. The nature of the material (snail shells, shark teeth, whale bones) and its age give glimpses into the past continuum of environments leading to the present. More than any other geological feature, fossils bring home to the general public the meaning of geological time. Fossil sites were given consideration in this survey, but they generally included few ecologically valuable features and received low ratings.

Strictly geological features and archeological sites were not included in this study. In any expansion or subsequent refinement, they should ideally be included.

Well-Documented Sites

An area that has been the subject of continuing scientific research, is of great value for it is possible to use the background of data to help predict the future and to deepen our understanding of the local environment. Such areas were given high consideration in the selection of natural areas.

Plummers Island in the Potomac River above Washington, D. C. is the site of many biological surveys and censuses and is the type locality site for many species of plants and animals. Areas of this type with many years of records and numerous publications should be preserved with a high priority.

Exceptional Individuals or Associations

Records are often kept for the largest individual of a species, such as the Wye Oak, located in the eastern shore area of Maryland, which is the largest white oak known. While of limited scientific value, these largest and oldest individuals are of interest to the public.

The presence of a virgin (or late successional) stand of almost any species of tree is of interest in the eastern United States and should be preserved with a high priority.

Associations of species rarely found together are also of interest, such as northern mountain species occurring together with southern lowland species. This often indicates relict conditions such as hemlock and rhododendron isolates and northern species left in sphagnum bogs adjacent to southern communities of plants.

Size of Area

The bigger an area, the greater its diversity of ecosystems, communities and species is likely to be. In smaller isolated areas the larger predators which act as regulators are usually missing and may require intervention by man to prevent too large populations of primary herbivores.

The minimum size required for a natural area has been discussed almost endlessly and to halt repetitive debate certain arbitrary sizes have been set. The prime function of size as a criteria lies in the viability of the ecosystem to be protected. This varies greatly depending on the ecosystem. A tenth acre bog may be quite defensible with some protecting buffer zone. A small area of mountain top or a small island can be preserved and maintained with relative ease. In addition, a half acre plot of rare tall-grass prairie in a cemetery or along a railroad should be preserved as a natural area.

On the other hand, pine flatland may require over 1,000 acres to provide examples of the usual species expected in such an area. There is no rule for determining the minimum size of an

area to be protected, but 'the larger the better' is the usual rule as long as the natural area contains ecologically important and significant biota and functions.

Some natural areas may require a buffer area to prevent contamination, silting, or protection from other human interferences. Buffer zones may themselves be true natural areas or areas with conservation easements to prevent destruction or exploitation, hunting and/or fishing, or otherwise to assure the protected area's viability.

IV. RANKING THE AREAS

On Methods

For this survey ecological and other data for the region were compiled from all available sources including scientific publications, popular literature, and from individuals and organizations. A questionnaire entitled "Chesapeake Bay Natural Areas Survey" was sent to several individuals to ascertain its effectiveness but it was found that direct contacts and other sources were more effective: the questionnaire was not extensively used. A questionnaire on rare and endangered species, however, was very productive.

The data for the region and each proposed site were entered onto maps and a data retrieval system was set up to handle non-graphic data. Eventually these data were organized in the format of the National Registry of Natural Areas and entered into its computer file. In the early part of the survey, time limitations and the need for portability of the information suggested a simpler, interim solution. Data cards (Burroughs Y-0 Unisort) conducive to a punch-hole sorting technique were typed for each natural area. The system can handle 22 blocks of ten bits each or 220 items per card. Desired information can be located in the master key describing the block information, a rod run through the proper hole, and the cards punched for that hole fall loose and deliver the data. The major advantages of the system are the portability of the entire deck, the elimination of alphabetization and cross

indexing, and the ability, with a modest amount of hand sorting, to group and regroup the data in any desired way. The information from the data cards was used to develop the computer registry.

A geographic inventory approach was developed so that each element of data would be mapped at a common scale on a standard base map of the entire Chesapeake Bay study area. Since there was no existing map of the entire region sufficiently detailed to portray area information such as wetlands or other important natural areas, a base map was made using a mosaic of the seven 1:250,000 scale U. S. Geological Survey topographic maps of the area.

Data were mapped on transparent overlays to allow for manipulation and analysis, and on topographic map base sheets that could be inexpensively reproduced as osalid prints. Several reproducible mylar base sheets were prepared, each containing a photographic copy of the map mosaic and displaying the standard information such as cities and towns, roads, topography, and water features.

Because of the need for more detailed mapping of specific sites and natural phenomena, it was necessary to prepare a set of 1:24,000 scale (7 1/2 minute) USGS topographic quadrangle maps covering the study area represented on the 1:250,000 scale maps. A complete set of 281 topographic maps was assembled and keyed to the larger study area map by numerical index.

The 1:250,000 maps and overlay techniques visually showed the ecologically important and significant features of the area, and areas required for their preservation.

The Numerical Ranking System

To set priorities among 232 diverse areas calls for a numerical ranking system whereby one can weight selected criteria that delineate ecological and, in some instances, social values. Some criteria require not only detailed knowledge of the sites in question but also a broad knowledge of the range and rarity of plant and animal species.

In other words, numerical values were assigned each criterion based on ecological judgment. Modifications were made in the course of the project and testing and further improvements of the system are needed. The weighting system gives greater importance to plant communities or types that are not in the National System of Research Natural Areas, those for which there are already many examples. Also, the factors of diversity, quality, lack of past and present disturbance, protectability, and other factors have been given appropriate weighting.

Subjective evaluation could be added to take into account species with human emotional or national significance. The condor, whooping crane or bald eagle have higher importance for preservation than a subspecies of sedge which can be identified by only a few specialists.

Several other ecological ranking systems have tried to take into account the factors of man-induced pressures on the land and relative isolation from development. Indeed, one of the original rankings used in this study gave added weight to threatened areas. This seems to make sense for any setting of priorities as far as timing is concerned. But as far as true ecological value is the measure, isolation from threatened destruction should receive greater numerical value. If both of these factors are included in one system, they tend to cancel each other out. For these reasons we have excluded the factors of threat and isolation. In the implementation of preservation actions, however, the ecologically important areas that are threatened most should of course be worked on first.

Selection of Proposed Natural Areas. In making the quantitative evaluation of each site considered as a natural area, all of the data in the file for each site were put into a standardized format for natural areas. This is the system jointly developed for the Natural Area Registry by The Nature Conservancy and the Smithsonian Center for Natural Areas. It is compatible with the system used by the U. S. Committee on Conservation of Ecosystems of the International Biological Program. The data for the considered sites for the Chesapeake Bay are shown in the complete print-outs. They also contain the present rating for each site (also shown in the lists in this report). The ratings are not permanent and can be updated with the addition of further ecological information.

Some areas, of course, have extensive information, perhaps including records of species no longer present, and other areas have very little data but are still of great value. Therefore, the system is designed to be highly flexible with regular updating and change of ratings possible. For this reason, no data on sites with low ratings are destroyed since data may accumulate to increase the ratings. Also, areas with high ratings may be lowered with loss or destruction of ecological features.

Several versions of the ranking system were tried out in this survey. One of the early systems used gave equal weighting to each of the criteria but it was only partially successful in establishing what the project staff judged to be valid priorities. With the acquisition of more detailed data from each area a reevaluation was required and the present evaluation system was used. [SEE TABLE 4]

A separate but related procedure in the rating process was the use of mapping techniques. When all of the ecologically significant data on plants, animals, unique communities and habitats, wetlands and other features have been mapped and printed on transparent overlays, the data are then visually available. A base map of the areas presently protected, transparent ecological data overlays, and an overlay of the proposed natural area sites permit visual evaluation of the value of each proposed site and shows the need for additional specific natural area sites to protect concentrations of important fauna, flora, and ecosystems. Overlays

show the ranges of certain species, help in specifying critical sites for preservation, and are of great value in evaluating how effective the list of existing and proposed sites are in preserving the ecological features. Those sites with many valuable ecological features can then become the target of high priority field studies, as a prelude to procurement.

There were 232 areas considered, and rated, using the criteria and numerical weighting system in Table 4 and overlay maps 3 and 4. The highest rating was 24 and the lowest was 1. There were 57 areas with a rating of over 10. These have been selected for highest priority proposed primary natural areas. The rest are recommended for secondary consideration except for 7 areas recommended for special consideration. These include areas with 10 or less points but are essential to provide examples of outlier hemlock, bogs, or other special categories. Thus there are 64 areas which should be given primary consideration for procurement. This system gives a premium to diversity and the greater the variety of natural features and biota, the higher priority is the area. However, ecological judgment is required in making the final recommendations based on the number of ecosystem types represented and any special categories that must be considered. Since the data have been computerized, it is possible for a procurement agency to selectively determine priorities using selected categories. For example, if it is desired to select the areas with virgin or mature hardwoods, or

areas containing eagle nests, these can now be selected readily.

The 64 natural areas of prime ecological importance are listed below in Table 5 in order of numerical ranking. These and the remaining 168 areas are indexed by state and county on Page and by alphabetical order on Page , for ease in cross-referencing. The remaining areas under consideration which appear in Table 6 all received lower rankings using this particular system. They should not, however, be neglected because they could easily score much higher with different weightings or with the inclusion of other factors in the rating system.

The 64 prime natural areas represent roughly 28% of the original 232 areas considered and ranked. In area, the sixty-four sites include about 236 square miles. Thus we are recommending procurement or other preservation action for roughly 2% of the land in the Chesapeake Bay region study area. The Center for Natural Areas is already evaluating some of these areas as part of the Atlantic Coastal Plain Natural Landmark Survey, under contract with the National Park Service, Department of the Interior.

NOTE: This survey should not be considered final or complete. Some prime natural areas may have been inadvertently missed which should have been included. The Center for Natural Areas welcomes any and all additional ecological information to improve its knowledge of the Bay region.

TABLE 4. CRITERIA AND QUANTITATIVE VALUES
FOR SELECTION OF NATURAL AREAS

		<u>Points</u>
1.	Ecosystem Types	
	Diversity of ecosystem types	1 (each)
	Little or no past and present disturbance	2
	High diversity of species	2
	Type not represented in National Research Natural Area System	4
2.	Endangered, or Threatened Biota and Gene Pool Species	
	Endangered and threatened plant or animal species	4 (each sp.)
	Rare, declining, or depleted species	2 (each sp.)
3.	Range Phenomena	
	Outliers, disjuncts, or relict species	1
	Limits of range—N, S, E, W	1
	Restricted and endemic species	1
4.	Seasonal Concentrations of Animals	
	Seasonal breeders — nesting, spawning	1
	Overwintering concentrations	1
	Migratory concentrations	1
5.	Commercial, Game, or Unusual Animal Populations	
	Ungulates, game birds, fur bearers	1
	Fish, clams, oysters, crabs	1
6.	Paleontological, Geological and Archeological Features	
	Bones and artifacts, deposits of fossils, peat, lignite, sediments, structural and geomorphological features	1 (each feature)
7.	Sites of well documented scientific research or discovery and records over period of years	1
8.	Oldest, largest, or otherwise exceptional individuals or associations	1 (each)
9.	Size of area	
	<u>Acres</u>	<u>Hectares</u>
	Under 100 acres	Under 45
	100 - 1,000	45 - 457
	1,000 - 5,000	457 - 2,270
	over 5,000	over 2,270

Example of the Rating System in Use. Below is an illustration of the rating system as applied to Zekiah Swamp, the first-ranked area. The natural features of the site are listed or summarized on the left. On the right are the numerical values which apply to those features, according to the scheme in Table 4 on the previous page.

<u>Data</u>	<u>Points Awarded</u>
Zekiah Swamp	
Maryland	
Charles County	
5,385 hectares in size	4
Private ownership	
Hardwood swamp forest	1
Good stands of <u>Ilex opaca</u> , <u>Quercus palustris</u> , and <u>Liquidambar styraciflua</u> . Mature Timber.	
High diversity of plant species.	2
<u>Populaous heterophylla</u> , southern outlier	1
Beaver, mink (commercial species)	1
Osprey (depleted), heronry (seasonal breeders)	3
Wilson's snipe and wood duck (overwintering)	1
Concentration of migrating birds	1
Southern Bald Eagle nest (endangered)	4
Rare animals: red bellied woodpecker, Maryland Diamondback Terrapin, <u>Allocapania</u>	
Zekiah Stonefly	4
One of the largest of Maryland's remaining undisturbed swamps	2
Rating Total	24

V. MASTER LIST OF NATURAL AREAS

The following eighty-six color pages consist of a computer print-out of key information on all 232 areas considered in this survey, listed in order of ecological importance. There is of course no hard-and-fast necessity for the particular placement of each area in the list, especially for the areas which received equal numerical ratings. Therefore the reader should view this list with a certain fluidity, remembering that the ranks may change with improvement in data or insight. The list is separated on page 73, with primary areas recommended for preservation above and secondary areas recommended for consideration below. Note that some areas in the secondary section deserve special attention and should therefore be considered for preservation with the primary group. These seven areas are:

Helen Creek Hemlock Preserve; Calvert Co., Maryland; p73
Chisel Run Bog; James City Co., Virginia; p74
King Creek - Kingston Landing; Talbot Co., Maryland; p76
Blinkhorn Creek; Dorchester Co., Maryland; pp87 & 88
Round Bay Bog; Anne Arundel Co., Maryland; p91
Andover Branch; Queen Anne Co., Maryland; p101
Hemlock Stand on Mill Creek; Caroline Co., Maryland; p102

When searching for areas with high priority, consult the first part of the master list. When searching for areas within a particular county, consult the Index on page 119. Areas themselves can be found in the Alphabetical Index on page 130. To find the map location of an area, consult the U.S. Geological Survey 7.5 minute series topographic maps named under "Quadrangle" in the master list.

DATE: 10/19/73

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

SERIAL CATEG LINE CAT=DEFINITION

DATA

PAGE NO:

000000674 010 01 NAME OF AREA:
 STATE: 020 01
 COUNTY: 021 01 QUADRANGLE:
 030 01 OWNER 1:
 040 01 SIZE OF AREA:
 060 01 AQUATIC TYPES:
 151 01 BIOTIC COMPONENTS:
 170 01
 08 01 DESCRIPTION OF AREA:
 180 01 RARE AND ENDANGERED ANIMALS:
 191 01 02 CONTENTS IN MANUAL FILE:
 200 01 02
 301 01 AUTHOR:
 303 01 TITLE:
 304 01 JOURNAL:VOLUME:PAGES:
 400 01 AREA INCL. BUFFER ZONE:
 410 01 ECOLOGICAL RATING:
 000000608 010 01 NAME OF AREA:
 STATE: 020 01
 COUNTY: 021 01 QUADRANGLE:
 030 01 OWNER 1:
 040 01 SIZE OF AREA:
 170 01
 08 01 DESCRIPTION OF AREA:
 180 01 RARE AND ENDANGERED ANIMALS:
 191 01 02 CONTENTS IN MANUAL FILE:
 200 01 02
 410 01 NAME OF AREA:
 STATE: 020 01
 COUNTY: 021 01 QUADRANGLE:
 030 01 OWNER 1:
 040 01 SIZE OF AREA:
 170 01
 08 01 DESCRIPTION OF AREA:
 180 01 RARE AND ENDANGERED ANIMALS:
 191 01 02 CONTENTS IN MANUAL FILE:
 200 01 02
 410 01 NAME OF AREA:
 STATE: 020 01
 COUNTY: 021 01

ZEKIAH SWAMP

MARYLAND
 CHARLES
 HUGHESVILLE, MD; POPE'S CREEK, MD; LA PLATA, MD
 05385.3 HA
 PRIVATE
 SWAMP FOREST. HARDWOODS. BEAVER. MINK. OSPREY.
 OVERWINTERING WILSON'S SNIPE AND WOOD DUCK. HERONRY.
 GOOD STANDS OF ILEX OPACA. QUERCUS PALUSTRIS AND
 LIQUIDAMBAR STYRACIFLUA. VIRGIN TIMBER. MANY BIRD
 AND PLANT SPECIES. SORA RAIL CONCENTRATION OF
 MIGRATING BIRDS. MARYLAND DIAMONDBACK TERRAPIN.
 POPULUS HETEROPHYLLA. DISJUNCT POPULATION. SOUTHERN
 OUTLIER. POTOMOGETON PULCHER.

02 01 IN POTOMAC RIVER WATERSHED. ONE OF THE LARGEST
 NATURAL SWAMPS REMAINING IN MARYLAND
 EAGLE NEST! RED BELLED WOOD PECKER; ALLOCAPANIA
 ZEKIAH STONEFLY;
 TOPOGRAPHIC MAP;
 PUBLICACION
 TAYLOR, JOHN W
 THE WICOMICO RIVER
 ATLANTIC NAT. 9(3):133-138
 07320.5 HA
 24.

DRAGON RUN
 VIRGINIA
 KING AND QUEEN; MIDDLESEX; GLOUCESTER; ESSEX
 CHURCH VIEW, VA; SALUDA, VA; SHACKLEFORDS, VA
 02735.1 HA
 PRIVATE
 SWAMP FOREST. HARDWOODS. TAXODIUM DISTICHUM,
 CHAMAECYPARIS THYOIDES AND PINUS SP. OSPREY, BEAVER
 MINK, TURKEY AND OTTER.
 ANADROMOUS FISH. OVERWINTERING
 CANADA GEESE. HERONRY.
 NORTHERN LIMIT AT THIS LOCATION.
 FOSSIL SHELLS. ST. MARY'S FORMATION. TIMBER OPERATIONS.
 AREA STUDIED BY VIRGINIA OUTDOOR PLAN AS A SCENIC RIVER.
 PRIME WETLAND.
 EAGLE
 TOPOGRAPHIC MAP
 22

POCOMOKE RIVER SWAMP
 MARYLAND
 WORCESTER; WICOMICO; SOMERSET

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

DATE: 10/19/73

PAGE NO:

SERIAL CATEG LINE CAT-DEFINITION

DATA

000000610	030	01	QUADRANGLE!	PUBLIC LANDING, MD; SNOW HILL, MD; GIRDLETREE, MD;
	02	01	SIZE OF AREA:	POCOMOKE CITY, MD; KINGSTON, MD
040	01	OWNER I:	05841.8 HA	
060	01	AQUATIC TYPES:	PRIVATE	
151	01	BIOTIC COMPONENTS:	SWAMP FOREST, HARDWOODS, TAXODIUM DISTICHUM, PINUS SP., CHAMAECYPARIS THYOIDES, MAGNOLIA SP., ILEX AND TILLANDSIA USNEOIDES. SWAINSONS WARBLER, SHELLFISH, ANADROMOUS FISH, WOOD DUCK BREEDING, DEER, TWO EAGLE NESTS.	
170	01		INCREASING RESIDENTIAL AND OTHER DEVELOPMENT OF SHORELINE.	
04	01	DESCRIPTION OF AREA:	DANGER OF WATER POLLUTION, PRIME WETLANDS.	
180	01		ALNUS MARITIMA EAGLE NESTS	
	02	RARE AND ENDANGERED PLANTS:	22	
190	01	RARE AND ENDANGERED ANIMALS:		
191	01			
410	01	ECOLOGICAL RATING:		
000000601	010	01	NAME OF AREA:	CHICKAHOMINY, LOWER - PROVIDENCE FORGE VIRGINIA
	020	01	STATE:	CHARLES CITY, JAMES CITY, NEW KENT
021	01	COUNTY:	FORGE, VA; BRANDON, VA; WALKERS, VA; PROVIDENCE, VA	
030	01	QUADRANGLE:	02189.7 HA	
040	01	SIZE OF AREA:	PRIVATE	
060	01	OWNER I:	MARSH, FRESHWATER	
151	01	AQUATIC TYPES:	FRESHWATER MARSH VEGETATION, TAXODIUM DISTICHUM, OSPREY, ANADROMOUS FISH, HERONRY.	
170	01	BIOTIC COMPONENTS:	BROAD EXTENSIVE FINE MARSHES AND TAXODIUM DISTICHUM STANDS FLANKED IN PLACES BY CLIFFS UP TO 33 M HIGH.	
180	01	DESCRIPTION OF AREA:	IN JAMES RIVER WATERSHED. SOME OF BEST MARSHES IN VIRGINIA. PRIME WETLAND.	
	02		BACOPA STRAGULAI, BACOPA SIMULANS	
190	01	RARE AND ENDANGERED PLANTS:	19	
410	01	ECOLOGICAL RATING:		
000000603	010	01	NAME OF AREA:	CHICKAHOMINY, MIDDLE VIRGINIA
	020	01	STATE:	NEW KENT, CHARLES CITY, HENRICO
021	01	COUNTY:	QUINTON, VA; ROXBURY, VA; PROVIDENCE, VA; FORGE, VA	
030	01	QUADRANGLE:	03959.0 HA	
040	01	SIZE OF AREA:	PRIVATE	
060	01	OWNER I:	RIVER	
151	01	AQUATIC TYPES:	ANADROMOUS FISH, HERRING, SWAMP FOREST, HARDWOODS AND TAXODIUM DISTICHUM.	
170	01	BIOTIC COMPONENTS:	IN JAMES RIVER WATERSHED. PRIME WETLAND.	
02	01	DESCRIPTION OF AREA:	JUNCUS CAESARIENSIS, HELONIAS BULLATA, OSPREY	
180	01	RARE AND ENDANGERED PLANTS:	18	
190	01	RARE AND ENDANGERED ANIMALS:		
191	01			
410	01	ECOLOGICAL RATING:		
000000607	010	01	NAME OF AREA:	MATTAPONI RIVER, LOWER VIRGINIA
	020	01	STATE:	

DATE: 10/19/73

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

SERIAL CATEG LINE CAT-DEFINITION

DATA

00000607	021	01	COUNTY:	KING AND QUEEN;	KING WILLIAM	KING AND QUEEN COURT
	030	01	QUADRANGLE:	WEST POINT, VA;	TRUMHART, VA;	
	02	01	SIZE OF AREA:	HOUSE, VA;	KING WILLIAM, VA;	AYLETT, VA
	040	01	OWNER I:	01903.0 HA		
	060	01	AQUATIC TYPES:	PRIVATE MARSH, FRESHWATER;	RIVER;	TIDAL
	151	01	BIOTIC COMPONENTS:	MAJOR MARSHES FOR ANADROMOUS FISH.	STRIPED BASS,	
	170	01		HERRING.	HIGH TIDAL MARSH WITH SPARTINA CYNOSUROIDES	
	02			PRESENT.		
	03			IN MATTAPONI AND YORK RIVERS WATERSHED.	SOME OF THE	
180	01		DESCRIPTION OF AREA:	FINEST MARSHES IN TIDEWATER VIRGINIA.		
	02			BACOPA STRAGULATA	CASSIA FASCICULATA VAR.	MACROSPERMA
190	01		RARE AND ENDANGERED PLANTS:	EAGLE NEST		
191	01		RARE AND ENDANGERED ANIMALS:	05223.7 HA		
400	01		AREA INCL. BUFFER ZONE:	18		
410	01		ECOLOGICAL RATING:			
00000609	010	01	NAME OF AREA:	PATUXENT RIVER		
	020	01	STATE:	MARYLAND		
	021	01	COUNTY:	CALVERT	PRINCE GEORGES; ANNE ARUNDEL	
	030	01	QUADRANGLE:	LOWER MARLBORO, MD;	BRISTOL, MD; BENEDICT, MD	
	040	01	SIZE OF AREA:	04597.5 HA		
	060	01	OWNER I:	PRIVATE		
	170	01	BIOTIC COMPONENTS:	EAGLE, OTTER, MINK, KING RAIL.	HERONRY, WOOD DUCK,	
	02			TEAL.	ANADROMOUS FISH. SHAD, HERRING, STRIPED BASS,	
	03			PLANT SPECIES INCLUDE TYPHA SP., ORONTIUM AQUATICUM,	PONTEDERIA SP., HIBISCUS PALUSTRIS AND SPARTINA SP.	
	04			SORA RAIL CONCENTRATED IN FULL MIGRATION.		
	05			PRIME WETLAND.		
180	01		DESCRIPTION OF AREA:	EAGLE NEST		
191	01		RARE AND ENDANGERED ANIMALS:	17		
410	01		ECOLOGICAL RATING:			
00000665	010	01	NAME OF AREA:	CEDARS, THE - CHURCH CREEK - RINGOLD POINT		
	020	01	STATE:	MARYLAND		
	021	01	COUNTY:	KENT		
	030	01	QUADRANGLE:	LANGFORD CREEK, MD		
	040	01	SIZE OF AREA:	00395.9 HA		
	060	01	OWNER I:	PRIVATE		
	151	01	AQUATIC TYPES:	HIGH TIDAL MARSH, FRESHWATER MARSH VEGETATION WITH TYPHA SP.		
	170	01	BIOTIC COMPONENTS:	HIGH TIDAL MARSH AND FRESHWATER MARSH VEGETATION WITH TYPHA SP.		
	02			UPLAND MATURE HARDWOODS.	OSPREY, OTTER, WOOD DUCK, CRAB AND	
	03			OYSTERS.	ANADROMOUS FISH, STRIPED BASS, WHISTLING SWAN,	
	04			WINTERING.	IN CHESTER RIVER WATERSHED.	
180	01		DESCRIPTION OF AREA:	EAGLE NEST		
191	01		RARE AND ENDANGERED ANIMALS:	17		
410	01		ECOLOGICAL RATING:			
00000686	010	01	NAME OF AREA:	MILES CREEK		
	020	01	STATE:	MARYLAND		

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

DATE: 10/19/73

SERIAL CATEG LINE CAT-DEFINITION

DATA

00000686	021	01	COUNTY: QUADRANGLE:	TALBOT PRESTON, MD	MD	TRAPPE, MD
	030	01	SIZE OF AREA:	00492.9 HA		
	040	01	OWNER I:	PRIVATE		
	060	01	AQUATIC TYPES:	MARSH, FRESHWATER		
	151	01	BIOTIC COMPONENTS:	FRESHWATER MARSH WITH TYPHA SP. DELMARVA FOX SQUIRREL.		
	170	01		OSPREY, OTTER, EAGLE, ANADROMOUS FISH, STRIPED BASS		
	02			CRAB		
	03		DESCRIPTION OF AREA:	IN CHOPTANK RIVER WATERSHED.		
	180	01	RARE AND ENDANGERED ANIMALS:	EAGLE NEST; DELMARVA FOX SQUIRREL		
	191	01	AREA INCL. BUFFER ZONE:	01834.2 HA		
	400	01		17		
	410	01	ECOLOGICAL RATING:			
00000605	010	01	NAME OF AREA:	BLACKWATER RIVER		
	020	01	STATE:	VIRGINIA		
	021	01	COUNTY:	ISLE OF WIGHT		
	030	01	QUADRANGLE:	SOUTHAMPTON, SURRY		
	040	01	OWNER I:	FRANKLIN, VA		
	170	01	BIOTIC COMPONENTS:	SEDLEY, VA; ZUNI, VA; RAYNOR, VA		
	02		DESCRIPTION OF AREA:	RUNNEMEDE, VA; DENDRON, VA		
	040	01	RARE AND ENDANGERED PLANTS:	03514.8 HA		
	060	01	AREA INCL. BUFFER ZONE:	PRIVATE		
	170	01		SWAMP FOREST, HARDWOODS, TAXODIUM DISTICHUM. WIDE		
	02		DESCRIPTION OF AREA:	VARIETY OF FISH SPECIES.		
	180	01	RARE AND ENDANGERED PLANTS:	SCENIC RIVER.		
	190	01	AREA INCL. BUFFER ZONE:	LECHEA MARITIMA. PYXIDANTHERA BARBULATA.		
	410	01	ECOLOGICAL RATING:	16		
00000626	010	01	NAME OF AREA:	POROPOTANK MARSH - PURTAN MARSH		
	020	01	STATE:	VIRGINIA		
	021	01	COUNTY:	GOOLCESTER; KING AND QUEEN		
	030	01	QUADRANGLE:	GRESSITT, VA		
	035	01	COORDINATES:	37 26 -- N 076 41 -- W		
	040	01	SIZE OF AREA:	02468.4 HA		
	060	01	OWNER I:	LINDSEY, JOHN M.		
	151	01	AQUATIC TYPES:	MARSH, TIDAL		
	170	01	BIOTIC COMPONENTS:	HIGH TIDAL MARSH WITH JUNCUS ROEMERIANUS. OSPREY,		
	02		DESCRIPTION OF AREA:	OYSTERS, ANADROMOUS FISH, EAGLE.		
	180	01	RARE AND ENDANGERED ANIMALS:	IN YORK RIVER WATERSHED. PRESENT USE IS PRIMARILY		
	03		AREA INCL. BUFFER ZONE:	HUNTING PRESERVE FOR DUCKS, SHORE AND MARSH BIRDS.		
	191	01		PRIME WETLAND.		
	400	01	ECOLOGICAL RATING:	EAGLE NEST		
	410	01		05239.9 HA		
00000645	010	01	NAME OF AREA:	LILLY POINT MARSH		
	020	01	STATE:	VIRGINIA		
	021	01	COUNTY:	NEW KENT		
	030	01	QUADRANGLE:	TUNSTALL, VA		
	040	01	SIZE OF AREA:	NEW KENT, VA		

DATE: 10/19/73

SERIAL CATEG | INE CAT=DEFINITION

DATA

00000645	060	01	OWNER I: AQUATIC TYPES!
	151	01	BIOTIC COMPONENTS!
	170	01	
		02	DESCRIPTION OF AREA: RARE AND ENDANGERED PLANTS: RARE AND ENDANGERED ANIMALS: AREA INCL. BUFFER ZONE: ECOLOGICAL RATING:
		180	01
		190	01
		191	01
		400	01
		410	01

PRIVATE MARSH. FRESHWATER FRESHWATER MARSH VEGETATION. SWAMP FOREST.
HARDWOODS. ANADROMOUS FISH.
IN PAMUNKEY AND YORK RIVERS WATERSHEDS.
CASSIA FASCICULATA VAR. MACROSPERMA
EAGLE NEST
01567.5 HA
15

NAME OF AREA:	00000681
STATE:	01
COUNTY:	020
QUADRANGLE:	021
SIZE OF AREA:	030
OWNER I:	040
AQUATIC TYPES:	060
BIOTIC COMPONENTS:	151
	170
	02
	03
RARE AND ENDANGERED ANIMALS:	191
AREA INCL. BUFFER ZONE:	400
ECOLOGICAL RATING:	410

NANJEMOY CREEK - WARDS RUN
MARYLAND
CHARLES
NANJEMOY, MD; MATHIAS POINT, MD
01010.0 HA
PRIVATE
MARSH. FRESHWATER
FRESHWATER MARSH WITH TYPHA SP.
OSPREY. WOOD DUCK. LARGE MOUTH BASS.
FISH. HERONRY.
EAGLE NEST
03232.0 HA

00000615	010	01	NAME OF AREA:
	020	01	STATE:
	021	01	COUNTY:
	030	01	QUADRANGLE:
	040	01	SIZE OF AREA:
	060	01	OWNER I:
	151	01	AQUATIC TYPES:
	170	01	BIOTIC COMPONENTS:
	02		
	03		
	180	01	DESCRIPTION OF AREA:
	191	01	RARE AND ENDANGERED ANIMALS:
	200	01	CONTENTS IN MANUAL FILE:
	400	01	AREA INCL. BUFFER ZONE:
	410	01	ECOLOGICAL RATINGS:

CHOTANK CREEK
VIRGINIA
KING GEORGE
DAHLGREN, VA;
00735.3 HA
PRIVATE
MARSH. FRESHWATER; POND
FRESHWATER MARSH VEGETATION. UPLAND MATURE
HARDWOODS. BEAVER. ANADROMOUS FISH. TWO
PAIRS OF EAGLES. NESTING. DUCKS, GEESE.
BALD EAGLE NESTS
GENERAL INFORMATION; WATER QUALITY INFORMATION
02626.0 HA
14

	NAME OF AREA:
00000627	010 020 021 030 040 060 065 151
	STATE:
	01
	COUNTY:
	01
	QUADRANGLE:
	01
	SIZE OF AREA:
	01
	OWNER I:
	01
	OWNER II:
	01
	AQUATIC TYPES:
	01

POWHATAN CREEK
VIRGINIA
JAMES CITY
SURRY • VA
00404-0 HA
PRIVATE
FEDERAL • AGENCY
MARSH • FRESHWATER

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

DATE: 10/19/73

SERIAL CATEG LINE CAT-DEFINITION

DATA

00000627	170	01 BIOTIC COMPONENTS:	TIDAL FRESHWATER MARSH VEGETATION. ANADROMOUS FISH. HERRING. SARRACENIA PURPUREA. SYMPLOCARPUS FOETIDUS AND CALTHA PALUSTRIS. IMPORTANT TREES INCLUDE QUERCUS BICOLOR, PINUS TAEDA. LIRIODENDRON TULIPIFERA. QUERCUS ALBA. ACER RUBRUM. CARPINUS CAROLINIANA. LIQUIDAMBAR STYRACIFLUA. ILEX OPACA AND MAGNOLIA VIRGINIANA.
	02	01 DESCRIPTION OF AREA:	IN JAMES RIVER WATERSHED. FOREST IS BEING SELECTIVELY CUT.
	180	01 RARE AND ENDANGERED PLANTS:	TRILLIUM PUSillum. ISOTRIA MEDEOLOIDES.
	190	01 AREA INCL. BUFFER ZONE:	00727.2 HA
	400	01 ECOLOGICAL RATING:	14
00000636	010	01 NAME OF AREA:	HOLLIS MARSH
	020	01 STATE:	VIRGINIA
	021	01 COUNTY:	WESTMORELAND
	030	01 QUADRANGLE:	STRATFORD HALL, VA
	040	01 SIZE OF AREA:	0008.9 HA
	060	01 OWNER I:	PRIVATE
	151	01 AQUATIC TYPES:	MARSH. TIDAL HIGH TIDAL MARSH VEGETATION. OSPREY, HERONS, EGRETS, CHAMAECYPARIS THYOIDES. BREEDING OF CLAPPER RAIL.
	170	01 BIOTIC COMPONENTS:	ABOUT 20 OSPREY NESTS.
	02	03 DESCRIPTION OF AREA:	IN POTOMAC RIVER WATERSHED. AT NORTHWEST END OF NOMINI BAY. NARROW SANDY BEACH ALONG NORTHERN SHORE. SHORT SAND SPIT AT EACH END OF ISLAND. PRIME WETLANDS.
	180	01	SEE ALSO RECORD 00000700. CURRIOMAN BAY.
	02	03	EAGLE NEST
	03	04 RARE AND ENDANGERED ANIMALS:	PUBLICATION
	191	01 CONTENTS IN MANUAL FILE:	ABBOTT, JACKSON M.
	200	01 AUTHOR:	1955
	301	01 TITLE:	THE HOLLIS MARSH ISLAND HERONRY
	302	01 JOURNAL/VOLUME/PAGES:	ATLANTIC NAT. 12(2):71-74
	303	01 ECOLOGICAL RATING:	14
	304	01	
	410	01	
00000661	010	01 NAME OF AREA:	FRESH POND
	020	01 STATE:	MARYLAND
	021	01 COUNTY:	ANNE ARUNDEL
	030	01 QUADRANGLE:	GIBSON ISLAND, MD
	040	01 SIZE OF AREA:	00052.5 HA
	060	01 OWNER I:	PRIVATE
	151	01 AQUATIC TYPES:	UPLAND FOREST. QUERCUS & CARYA. ANIMAL SPECIES PRESENT MAY POSSIBLY INCLUDE A RARE SPECIES OF DRAGONFLY,
	170	01 BIOTIC COMPONENTS:	CARPENTER FROG. ANDERSON'S TREEFROG AND BOGG LEMMING. SPHAGNUM BOG, DROSERA SP., SARRACENIA SP., AND VACCINIUM SP. (CRANBERRY). OSPREY.
	02	05 DESCRIPTION OF AREA:	CONSIDERED AN EXCELLENT SITE. ALSO KNOWN AS ANGEL'S BOG. BOG IS ADJACENT TO POND. BEING ENCROACHED BY
	02	06	

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

DATE: 10/19/73

SERIAL CATEG LINE CAT-DEFINITION

DATA

00000661	180	03	CONTENTS IN MANUAL FILE:
	200	01	ECOLOGICAL RATING:
	410	01	
00000794	010	01	NAME OF AREA:
	020	01	STATE:
	021	01	COUNTY:
	030	01	QUADRANGLE:
	040	01	SIZE OF AREA:
	060	01	OWNER I:
	151	01	AQUATIC TYPES:
	170	01	BIOTIC COMPONENTS:
180	01	DESCRIPTION OF AREA:	
	02		
	03		
	04	RARE AND ENDANGERED ANIMALS:	
	191	01	AREA INCL. BUFFER ZONE:
	400	01	
	410	01	ECOLOGICAL RATING:
00000602	010	01	NAME OF AREA:
	020	01	STATE:
	021	01	COUNTY:
	030	01	QUADRANGLE:
	040	01	SIZE OF AREA:
	060	01	OWNER I:
	151	01	AQUATIC TYPES:
	170	01	BIOTIC COMPONENTS:
180	01	DESCRIPTION OF AREA:	
	02		
	03		
	04		
	05		
	06	RARE AND ENDANGERED ANIMALS:	
	191	01	
	410	01	ECOLOGICAL RATING:
00000635	010	01	NAME OF AREA:
	020	01	STATE:
	021	01	COUNTY:
	030	01	QUADRANGLE:
	040	01	SIZE OF AREA:

SUBURBAN DEVELOPMENT.
SPECIES LIST: PLANT
14

REED CREEK - GORDON POINT - WRIGHT NECK
MARYLAND
QUEEN ANNE
LANGFORD CREEK, MD
00416•1 HA
PRIVATE
MARSH. TIDAL
PATENS, DISTICHLIS SP. AND JUNCUS ROEMERIANUS. EAGLE,
ANADROMOUS FISH, STRIPED BASS, ABUNDANT SHELLFISH,
CRABS, CLAMS, SUNFISH, PERCH, HERONRY, WHISTLING
SWAN, HARDWOOD FOREST.

REED CREEK IS SHORT TRIBUTARY OF CHESTER RIVER.
A FEW LARGE FORMS ON THE INTERIOR SHORE. SEMI-
SECLUDED. RECOMMENDED FOR PRESERVATION BY
CHESAPEAKE BAY FOUNDATION. PRIME WETLAND.
EAGLE NEST
01058•5 HA
14

CHICKAHOMINY, UPPER
VIRGINIA
HENRICO, NEW KENT
SEVEN PINES, VA; RICHMOND, VA; YELLOW PINES, VA
02755•3 HA
PRIVATE
RIVER
SWAMP FOREST, HARDWOODS AND TAXODIUM DISTICHUM. A
RARE INTRODUCED SPECIES. ANEILEMA KEISAK OCCURS.
BROAD EXTENSIVE FINE MARSHES. EAGLES, NESTING.
IN JAMES RIVER WATERSHED. SCENIC RIVER BOTTOMLAND
FOREST NOT IMPRESSIVE. LOCATED NEAR INTERSTATE 95.
WOODED SWAMPS ALONG UNPOLLUTED CHICKAHOMINY RIVER. AREA
IS NARROW DRAINAGE CHANNEL FOR EXTENSIVE SWAMPY REGION
SUBJECT TO DEVELOPMENT PRESSURE FROM NORTHEAST SUBURBS
OF RICHMOND.
EAGLE NEST
13

UPPER CHIPPOKE CREEK
VIRGINIA
PRINCE GEORGE, SURRY
SAVEDGE, VA
00703•0 HA

61

DATE: 10/19/73

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

SERIAL CATEG LINE CAT-DEFINITION

DATA

000000635	060	01 OWNER I: 151 AQUATIC TYPES; 170 BIOTIC COMPONENTS;	01 PRIVATE MARSH, FRESHWATER FRESHWATER MARSH VEGETATION. FISH. STRIPED BASS, HERRING. DISTICHUM STAND. NEAR MATURE TAXODIUM HARDWOODS. IN JAMES RIVER WATERSHED. MIocene FOSSILS. PRIME WETLANDS.	01 OSPREY. ANADROMOUS NEAR MATURE TAXODIUM STATE OF RAVINE
	180	01 DESCRIPTION OF AREA:	02	04 IN JAMES RIVER WATERSHED. MIocene FOSSILS. PRIME WETLANDS.
	400	01 AREA INCL. BUFFER ZONE:	01	02 02258.4 HA
	410	01 ECOLOGICAL RATING:	13	
000000706	010	01 NAME OF AREA: 020 01 STATE: 021 01 COUNTY: 030 01 QUADRANGLE: 040 01 SIZE OF AREA: 060 01 OWNER I: 151 01 AQUATIC TYPES; 170 01 BIOTIC COMPONENTS;	01 CURRIOMAN BAY VIRGINIA WESTMORELAND STRATFORD HALL, VA 02222.0 HA PRIVATE MARSH. TIDAL HIGH TIDAL MARSH. PLANT SPECIES INCLUDE SPARTINA PATENS, DISTICHLIS SP. AND JUNCUS ROEMERIANUS. UPLAND HARDWOODS. OSPREY. IN POTOMAC WATERSHED. PRIME WETLANDS. SEE ALSO RECORD 0000636; HOLLIS MARSH.	01 EAGLE NEST 13
	180	01 DESCRIPTION OF AREA:	02	03 IN POTOMAC WATERSHED. PRIME WETLANDS.
	191	01 RARE AND ENDANGERED ANIMALS:	01	02 EAGLE NEST
	410	01 ECOLOGICAL RATING:	13	
000000777	010	01 NAME OF AREA: 020 01 STATE: 021 01 COUNTY: 030 01 QUADRANGLE: 040 01 SIZE OF AREA: 060 01 OWNER I: 065 01 OWNER II: 151 01 AQUATIC TYPES; 170 01 BIOTIC COMPONENTS;	01 CEDAR POINT NECK MARYLAND CHARLES MATHIAS POINT, MD 02020.0 HA PRIVATE FEDERAL, MILITARY MARSH. TIDAL HIGH TIDAL MARSH. PLANT SPECIES INCLUDE SPARTINA PATENS, DISTICHLIS SP. AND JUNCUS ROEMERIANUS. SWAMP FOREST, HARDWOODS. OTTER. MINK. ANADROMOUS FISH. NO PRESERVATION IN EFFECT ON PRIVATELY OWNED SECTION. APPROXIMATELY ONE HALF OF THE AREA COMPRISSES THE BLOSSOM POINT PROVING GROUNDS. LOCATED ON NANJEMOY CREEK.	01 EAGLE NEST 13
	180	01 DESCRIPTION OF AREA:	02	03 APPROXIMATELY ONE HALF OF THE AREA COMPRISSES THE BLOSSOM POINT PROVING GROUNDS. LOCATED ON NANJEMOY CREEK.
	191	01 RARE AND ENDANGERED ANIMALS:	01	02 EAGLE NEST
	410	01 ECOLOGICAL RATING:	13	
000000779	010	01 NAME OF AREA: 020 01 STATE: 021 01 COUNTY:	01 LLOYD CREEK MARYLAND CHARLES	

DATE: 10/19/73

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

SERIAL CATEG LINE CAT-DEFINITION

DATA

000000779	030	01 QUADRANGLE! 040 01 SIZE OF AREA: 060 01 OWNER I: 151 01 AQUATIC TYPES: 170 01 BIOTIC COMPONENTS:	COLONIAL BEACH NORTH, MD 0016.2 HA PRIVATE MARSH, TIDAL HIGH TIDAL MARSH. CYNOSUROIDES. EAGLE, OTTER, MINK, OVERWINTERING SWAN, CRABS AND OYSTERS. ANADROMOUS FISH, STRIPED BASS, OSPREY.
	191	01 RARE AND ENDANGERED ANIMALS: 410 01 ECOLOGICAL RATING:	
000000831	010	01 NAME OF AREA: 020 01 STATE: 021 01 COUNTY: 030 01 QUADRANGLE! 040 01 SIZE OF AREA: 060 01 OWNER I: 151 01 AQUATIC TYPES: 170 01 BIOTIC COMPONENTS: 410 01 ECOLOGICAL RATING:	PASSMORE CREEK VIRGINIA JAMES CITY SURREY, VA HOG ISLAND, VA 0024.4 HA COLONIAL NATIONAL HISTORICAL PARK MARSH, TIDAL HIGH TIDAL MARSH. DISTICHUM. THREE HERONRIES. SWAMP FOREST, HARDWOODS AND TAXODIUM 13 13
	010	01 NAME OF AREA: 020 01 STATE: 021 01 COUNTY: 030 01 QUADRANGLE! 040 01 SIZE OF AREA: 060 01 OWNER I: 151 01 AQUATIC TYPES: 170 01 BIOTIC COMPONENTS: 410 01 ECOLOGICAL RATING:	BLUFF POINT MARSH VIRGINIA NORTHUMBERLAND FLEETS BAY, VA 0017.2 HA PRIVATE MARSH, TIDAL, POND, ESTUARINE HIGH TIDAL MARSH VEGETATION, UPLAND MATURE HARDWOODS. OSPREY, OYSTERS. HERONRY, SHORE BIRDS AND WATERFOWL. PRIME WETLAND. 00723.2 HA 12
000000614	010	01 NAME OF AREA: 020 01 STATE: 021 01 COUNTY: 030 01 QUADRANGLE! 040 01 SIZE OF AREA: 060 01 OWNER I: 151 01 AQUATIC TYPES: 170 01 BIOTIC COMPONENTS: 03 01 DESCRIPTION OF AREA: 180 01 AREA INCL. BUFFER ZONE! 400 01 ECOLOGICAL RATING: 410 01	YARMOUTH ISLANDS - SIMPSON - WRIGHT VIRGINIA JAMES CITY NORGE, VA 01151.4 HA PRIVATE MARSH, FRESHWATER FRESHWATER MARSH VEGETATION, SWAMP FOREST, HARDWOODS, TAXODIUM DISTICHUM. OSPREY, HERONRY. ANADROMOUS FISH. IN CHICKAHOMINY RIVER WATERSHED. THE LITTLE CREEK AREA HAS BEEN PURCHASED BY CITY OF NEWPORT NEWS IN 02
000000621	010	01 NAME OF AREA: 020 01 STATE: 021 01 COUNTY: 030 01 QUADRANGLE! 040 01 SIZE OF AREA: 060 01 OWNER I: 151 01 AQUATIC TYPES: 170 01 BIOTIC COMPONENTS: 03 01 DESCRIPTION OF AREA: 180 01	02

CHESSAPEAKE BAY SURVEY REPORT
MASTER LIST

DATE: 10/19/73

SERIAL CATEG LINE CAT-DEFINITION

DATA

				ANTICIPATION OF MAKING A RESERVOIR IN THIS PART OF THE WATERSHED. PRIME WETLAND.
00000621	180	03	04	AREA INCL. BUFFER ZONE!
	400	01	01	ECOLOGICAL RATING!
	410	01		
00000622	010	01	01	NAME OF AREA! STATE: COUNTY:
	020	01		VIRGINIA KING GEORGE
	021	01		KING GEORGE, VA
	030	01	01	QUADRANGLE!
	035	01		COORDINATES!
	040	01		38 20 -- N 077 10 --- W
	060	01		00169.7 HA
	061	01		PRIVATE
	151	01		MARSH. FRESHWATER
	170	01		UPLAND MATURE HARDWOODS. OLD GROWTH EXCELLENT FOREST
	02			WITH LIRIODENDRON TULIPIFERA AND QUERCUS SPP. DOMINANT
	03			SHORE BIRDS. WATERFOWL. EAGLE. HEAVY DEER POPULATION.
180	01			IN POTOMAC RIVER WATERSHED. LONG FRONTAGE OF BEACH AND
	191	01		MARSHLAND ALONG ONE SIDE OF TRACT.
	410	01		EAGLE NEST
				12
00000632	010	01	01	NAME OF AREA! STATE: COUNTY:
	020	01		VIRGINIA JAMES CITY
	021	01		BRANDON, VA
	030	01		NORGE, VA
	040	01		00864.4 HA
	060	01		POWHATAN HUNT CLUB
	061	01		MARSH. FRESHWATER
	151	01		FRESHWATER MARSH VEGETATION. SWAMP FOREST, HARDWOODS
	170	01		AND TAXODIUM DISTICHUM. ZIZANIA SP., PELTANDRA SP.
	02			AND NUPHAR SP. OSPREY.
180	01			IN CHICKAHOMINY AND JAMES RIVERS WATERSHEDS. PRIME
	02			WETLANDS.
	400	01	01	02060.4 HA
	410	01		12
00000634	010	01	01	NAME OF AREA! STATE: COUNTY:
	020	01		VIRGINIA NEW KENT
	021	01		JAMES CITY
	030	01		TOANO, VA
	040	01		00565.6 HA
	060	01		PRIVATE
	151	01		MARSH. TIDAL
	170	01		HIGH TIDAL MARSH VEGETATION.
	02			ANADROMOUS FISH.
180	01			IN YORK RIVER WATERSHED.
	191	01		EAGLE NEST
	400	01		01971.5 HA

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

DATE: 10/19/73

SERIAL CATEG LINE CAT-DEFINITION

DATA

00000634	410	01	ECOLOGICAL RATING:	12
00000657	010	01	NAME OF AREA:	
	020	01	STATE:	
	021	01	COUNTY:	
	030	01	QUADRANGLE:	
	040	01	SIZE OF AREA:	
	060	01	OWNER I:	
	151	01	AQUATIC TYPES:	
	170	01	BIOTIC COMPONENTS:	
180	01	01	DESCRIPTION OF AREA:	
	190	01	RARE AND ENDANGERED PLANTS:	
	191	01	RARE AND ENDANGERED ANIMALS:	
	410	01	ECOLOGICAL RATING:	
00000660	010	01	NAME OF AREA:	
	020	01	STATE:	
	021	01	COUNTY:	
	030	01	QUADRANGLE:	
	040	01	SIZE OF AREA:	
	060	01	OWNER I:	
	151	01	AQUATIC TYPES:	
	170	01	BIOTIC COMPONENTS:	
400	01	01	AREA INCL. BUFFER ZONE:	
	410	01	ECOLOGICAL RATING:	
00000666	010	01	NAME OF AREA:	
	020	01	STATE:	
	021	01	COUNTY:	
	030	01	QUADRANGLE:	
	040	01	SIZE OF AREA:	
	060	01	OWNER I:	
	151	01	AQUATIC TYPES:	
	170	01	BIOTIC COMPONENTS:	
180	01	01	DESCRIPTION OF AREA:	
	191	01	RARE AND ENDANGERED ANIMALS:	
	400	01	AREA INCL. BUFFER ZONE:	
	410	01	ECOLOGICAL RATING:	
00000689	010	01	NAME OF AREA:	
	020	01	STATE:	
	021	01	COUNTY:	
	040	01	SIZE OF AREA:	
CHICONE CREEK - BIG CREEK MARSH MARYLAND DORCHESTER MARDELLA SPRINGS, MD PRIVATE MARSH, FRESHWATER FRESHWATER MARSH WITH TYPHA SP., SWAMP FOREST, PINUS SPP. AND CHAMAECYPARIS THYOIDES. OTTER, NUTRIA AND TERRAPIN. CRAB. ANADROMOUS FISH. STRIPED BASS. IN NANTICOKE RIVER WATERSHED. PRIME WETLAND.				
MARYLAND ANNE ARUNDEL SOUTH RIVER, MD PRIVATE MARSH, FRESHWATER FRESHWATER MARSH WITH TYPHA SP. SWAMP FOREST, HARDWOODS. CLAMS AND CRABS. WOOD DUCK. YELLOW PERCH RUNS.				
KILLECK CREEK - TRENT HALL CREEK MARYLAND ST. MARY'S MECHANICSVILLE, MD PRIVATE MARSH, TIDAL I, MARSH, FRESHWATER MARSH VEGETATION WITH TYPHA SP. MINK, OTTER, OYSTER, CLAMS, OVERWINTERING SWAN AND WOOD DUCK. IN PATUXENT RIVER WATERSHED.				
PERRY BRANCH MARYLAND CHARLES 00076.8 HA				

DATE: 10/19/73

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

SERIAL CATEG LINE CAT-DEFINITION

DATA

000000689	060	01	OWNER I:		PRIVATE MARSH. TIDAL HIGH TIDAL MARSH. PLANT SPECIES INCLUDE SPARTINA CYNOSUROIDES. MINK, OTTER, OSPREY. ANADROMOUS FISH, STRIPED BASS. CRAB.
	151	01	AQUATIC TYPES:		IN POTOMAC RIVER WATERSHED.
	170	01	BIOTIC COMPONENTS:		EAGLE NEST
	02		DESCRIPTION OF AREA:		12
	180	01	RARE AND ENDANGERED ANIMALS:		
	191	01			
	410	01	ECOLOGICAL RATING:		
000000713	010	01	NAME OF AREA:	WEYANOE POINT	
	020	01	STATE:	VIRGINIA	
	021	01	COUNTY:	CHARLES CITY	
	030	01	QUADRANGLE:	CHARLES CITY, VA	
	040	01	SIZE OF AREA:	00129.3 HA	
	060	01	OWNER I:	PRIVATE	
	151	01	AQUATIC TYPES:	MARSH, FRESHWATER SWAMP FOREST, HARDWOODS AND TAXODIUM DISTICHUM.	
	170	01	BIOTIC COMPONENTS:	ANADROMOUS FISH. CASSIA FASCICULATA VAR. MACROSPERMA FOUND NEAR AREA.	
	03		DESCRIPTION OF AREA:	IN JAMES RIVER WATERSHED. PRIME WETLANDS.	
	180	01	RARE AND ENDANGERED PLANTS:	CASSIA FASCICULATA VAR. MACROSPERMA	
	190	01	AREA INCL. BUFFER ZONE:	00161.6 HA	
	400	01			
	410	01	ECOLOGICAL RATING:	12	
000000720	010	01	NAME OF AREA:	GARNETTS CREEK MARSH	
	020	01	STATE:	VIRGINIA	
	021	01	COUNTY:	KING AND QUEEN	
	030	01	QUADRANGLE:	KING AND QUEEN COURTHOUSE, VA	
	040	01	SIZE OF AREA:	00250.5 HA	
	060	01	OWNER I:	PRIVATE	
	151	01	AQUATIC TYPES:	MARSH, FRESHWATER MARSH SPECIES.	
	170	01	BIOTIC COMPONENTS:	FRESHWATER MARSH BASS AND HERRING.	
	02		DESCRIPTION OF AREA:	IN YORK RIVER WATERSHED.	
	180	01	RARE AND ENDANGERED PLANTS:	BACOPA STRAGULAI	
	190	01	AREA INCL. BUFFER ZONE:	CASSIA FASCICULATA VAR. MACROSPERMA	
	400	01		01547.3 HA	
	410	01	ECOLOGICAL RATING:	12	
000000746	010	01	NAME OF AREA:	MARYLAND NECK	
	020	01	STATE:	MARYLAND	
	021	01	COUNTY:	CHARLES	
	030	01	QUADRANGLE:	KING GEORGE, MD; WIDEWATER MD; NANJEMOY, MD; INDIAN	
	040	01	SIZE OF AREA:	HEAD, MD; QUANTICO, MD	
	060	01	OWNER I:	01018.3 HA	
	151	01	AQUATIC TYPES:	PRIVATE	
	170	01	BIOTIC COMPONENTS:	MARSH	
	02		DESCRIPTION OF AREA:	UPLAND MATURE HARDWOODS. EAGLE, OSPREY.	
	180	01	RARE AND ENDANGERED PLANTS:	93 PERCENT OF AREA IS WOODED. ANADROMOUS FISH.	
	400	01	AREA INCL. BUFFER ZONE:	IN POTOMAC RIVER WATERSHED. FOREST HAS BEEN LOGGED IN	
	410	01	ECOLOGICAL RATING:	16	

DATE: 10/19/73

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

SERIAL CATEG LINE CAT-DEFINITION

DATA

000000746	180	02	PAST. CONSISTS OF TWO REGIONS. THE FIRST, 3434 HA, LIES BETWEEN THE POTOMAC RIVER AND STATE ROUTE 224, HAS HIGH TIMBERED BLUFFS, SHALLOW COVES, AND MARSH. THE OTHER REGION IS ENCLOSED BY STATE ROUTES 6 AND 224 SOUTH OF THE TOWN OF NANJEMOY CONSISTS OF LARGE, FLAT, HEAVILY WOODED INLAND TRACTS. TOPOGRAPHY LEVEL TO ROLLING.
191	01	RARE AND ENDANGERED ANIMALS:	
200	01	CONTENTS IN MANUAL FILE:	
410	01	ECOLOGICAL RATING:	12
00000772	010	01	NAME OF AREA:
	020	01	STATE:
	021	01	COUNTY:
	030	01	QUADRANGLE:
	040	01	SIZE OF AREA:
	060	01	OWNER I:
	151	01	AQUATIC TYPES:
	170	01	BIOTIC COMPONENTS:
191	01	RARE AND ENDANGERED ANIMALS:	
400	01	AREA INCL. BUFFER ZONE:	
410	01	ECOLOGICAL RATING:	12
00000778	010	01	NAME OF AREA:
	020	01	STATE:
	021	01	COUNTY:
	030	01	QUADRANGLE:
	040	01	SIZE OF AREA:
	060	01	OWNER I:
	151	01	AQUATIC TYPES:
	170	01	BIOTIC COMPONENTS:
180	01	DESCRIPTION OF AREA:	
191	01	RARE AND ENDANGERED ANIMALS:	
400	01	AREA INCL. BUFFER ZONE:	
410	01	ECOLOGICAL RATING:	12
00000783	010	01	NAME OF AREA:
	020	01	STATE:
	021	01	COUNTY:
	030	01	QUADRANGLE:
	040	01	SIZE OF AREA:
	060	01	OWNER I:
	151	01	AQUATIC TYPES:

MAP: GENERAL INFORMATION

SPRING CREEK
MARYLAND
ST. MARY'S
MECHANICSVILLE, MD
00040•4 HA
PRIVATE
MARSH. TIDAL MARSH. PLANT SPECIES INCLUDE SPARTINA
HIGH TIDAL MARSH. PATENS, DISTICHIS SP. AND JUNCUS ROEMERIANUS.
FRESHWATER MARSH WITH TYPHA SP. MINK, OTTER,
OVERWINTERING SWANS. NESTING WOOD DUCKS, OYSTERS AND
CLAMS.
EAGLE NEST
00064•6 HA
12

FRAZIER NECK
MARYLAND
CAROLINE
TRAPPE, MD
00258•6 HA
PRIVATE
MARSH. FRESHWATER MARSH WITH SCIRPUS SPP., OSPREY, OTTER.
CRAB. ANADROMOUS FISH, STRIPED BASS, WHITE SHAD
AND HICKORY SHAD.
IN CHOPTANK RIVER WATERSHED. PRIME WETLANDS.
DELMARVA FOX SQUIRREL
00440•4 HA
12

BOW KNEE POINT
MARYLAND
TALBOT
PRESTON, MD
00129•3 HA
PRIVATE
MARSH. FRESHWATER BOG

DATE: 10/19/73

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

SERIAL CATEG LINE CAT-DEFINITION

DATA

000000783	170	01 BIOTIC COMPONENTS:	FRESHWATER MARSH WITH SCIRPUS SPP. SPHAGNUM SPP. DEPOSIT. ANADROMOUS FISH. STRIPED BASS. DELMARVA FOX SQUIRREL. OSPREY.
	180	01 DESCRIPTION OF AREA:	IN CHOPTANK RIVER WATERSHED. PRIME WETLAND.
	191	01 RARE AND ENDANGERED ANIMALS:	
	410	01 ECOLOGICAL RATING:	12
000000786	010	01 NAME OF AREA:	CHOPTANK RIVER - LYFORD LANDING
	020	01 STATE:	MARYLAND
	021	01 COUNTY:	CAROLINE
	030	01 QUADRANGLE:	HOBBS, MD
	040	01 SIZE OF AREA:	00327.2 HA
	060	01 OWNER I:	PRIVATE
	170	01 BIOTIC COMPONENTS:	SWAMP FOREST. HARDWOODS. PINUS SPP. OSPREY. OTTER. NESTING WOOD DUCKS. ANADROMOUS FISH. STRIPED BASS. HERRING. WHITE SHAD. HICKORY SHAD.
	180	01 DESCRIPTION OF AREA:	IN CHOPTANK RIVER WATERSHED
	410	01 ECOLOGICAL RATING:	12
000000789	010	01 NAME OF AREA:	LLOYD LANDING
	020	01 STATE:	MARYLAND
	021	01 COUNTY:	TALBOT
	030	01 QUADRANGLE:	TRAPPE, MD
	040	01 SIZE OF AREA:	00323.2 HA
	060	01 OWNER I:	PRIVATE
	151	01 AQUATIC TYPES:	MARSH. FRESHWATER
	170	01 BIOTIC COMPONENTS:	FRESHWATER MARSH WITH SCIRPUS SPP. OTTER. OSPREY AND CRABS. ANADROMOUS FISH. STRIPED BASS.
	180	01 DESCRIPTION OF AREA:	IN CHOPTANK RIVER WATERSHED. PRIME WETLANDS.
	191	01 RARE AND ENDANGERED ANIMALS:	DELMARVA FOX SQUIRREL
	410	01 ECOLOGICAL RATING:	12
000000795	010	01 NAME OF AREA:	WYE EAST RIVER
	020	01 STATE:	MARYLAND
	021	01 COUNTY:	QUEEN ANNE'S TALBOT
	030	01 QUADRANGLE:	WYE MILLS, MD
	040	01 SIZE OF AREA:	00133.3 HA
	060	01 OWNER I:	PRIVATE
	151	01 AQUATIC TYPES:	HIGH TIDAL MARSH. PLANT SPECIES INCLUDE SPARTINA PATENS. DISTICHLIS SP. AND JUNCUS ROEMERIANUS. WYE OAK.
	170	01 BIOTIC COMPONENTS:	OTTER. CRABS. ANADROMOUS FISH. STRIPED BASS.
	191	01 RARE AND ENDANGERED ANIMALS:	DELMARVA FOX SQUIRREL
	400	01 AREA INCL. BUFFER ZONE:	00606.0 HA
	410	01 ECOLOGICAL RATING:	12
000000806	010	01 NAME OF AREA:	POPLAR HILL CREEK

DATE: 10/19/73

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

SERIAL CATEG LINE CAT-DEFINITION

DATA

000000806	020	01	STATE:	MARYLAND
	021	01	COUNTY:	ST. MARY'S
	030	01	QUADRANGLE:	PINEY POINT, MD
	040	01	SIZE OF AREA:	00303•0 HA
	060	01	OWNER I:	PRIVATE
	170	01	BIOTIC COMPONENTS:	UPLAND MATURE HARDWOODS. BEAUTIFUL STAND OF PINUS spp. AND MIXED HARDWOODS. OSPREY.
180	01	DESCRIPTION OF AREA:	IN POTOMAC RIVER WATERSHED. ALONG SHORE POTOMAC RIVER ESTUARY. NO IMMINENT PRESERVATION PROBLEMS.	
191	01	RARE AND ENDANGERED ANIMALS:	EAGLE NEST	
400	01	AREA INCL. BUFFER ZONE:	00694•9 HA	
410	01	ECOLOGICAL RATING:	12	
000000613	010	01	NAME OF AREA:	SUNKEN MEADOW
	020	01	STATE:	VIRGINIA
	021	01	COUNTY:	SURRY
	030	01	QUADRANGLE:	CLAREMONT, VA
	040	01	SIZE OF AREA:	00444•4 HA
	060	01	OWNER I:	PRIVATE
	151	01	AQUATIC TYPES:	POND
	151	01	BIOTIC COMPONENTS:	UPLAND MATURE HARDWOODS. TAXODIUM DISTICHUM PRESENT IN POND.
180	02	DESCRIPTION OF AREA:	IN JAMES RIVER WATERSHED.	
190	01	RARE AND ENDANGERED PLANTS:	EUPATORIUM SALTIENSE	
410	01	ECOLOGICAL RATING:	11	
000000618	010	01	NAME OF AREA:	ACCAKEEK CREEK
	020	01	STATE:	VIRGINIA
	021	01	COUNTY:	STAFFORD
	030	01	QUADRANGLE:	PASSAPATANZY, VA
	040	01	SIZE OF AREA:	00327•2 HA
	060	01	OWNER I:	PRIVATE
	151	01	AQUATIC TYPES:	MARSH. FRESHWATER
	170	01	BIOTIC COMPONENTS:	NELumbo sp. (LOTUS LILY) MARSH. SPARTINA CYNOSUROIDES. NORTHERN LIMIT OF ZIZANIOPSIS MILIACEA.
	02	DESCRIPTION OF AREA:	ANADROMOUS FISH. HERRING. ERIANTHUS RAVENNAE. A RARE INTRODUCED SPECIES FROM SOUTHERN EUROPE. OCCURS.	
03	01	RARE AND ENDANGERED ANIMALS:	IN POTOMAC RIVER WATERSHED.	
191	01	AREA INCL. BUFFER ZONE:	EAGLE NEST	
400	01	ECOLOGICAL RATING:	01309•0 HA	
410	01		11	
000000639	010	01	NAME OF AREA:	PARSONS ISLAND - OLD NECK
	020	01	STATE:	VIRGINIA
	021	01	COUNTY:	CHARLES CITY
	030	01	QUADRANGLE:	BRANDON, VA
	040	01	SIZE OF AREA:	00541•4 HA
	060	01	OWNER I:	PRIVATE
	151	01	AQUATIC TYPES:	MARSH. FRESHWATER

DATE: 10/19/73

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

SERIAL	CATEG LINE	CAT-DEFINITION	DATA
00000639	170	01 BIOTIC COMPONENTS:	FRESHWATER MARSH VEGETATION. SWAMP FOREST. HARDWOODS, TAXODIUM DISTICHUM. OSPREY.
	02		ANADROMOUS FISH.
	03		IN CHICKAHOMINY AND JAMES RIVERS WATERSHEDS.
180	01 DESCRIPTION OF AREA:		PRIME WETLANDS.
400	02 AREA INCL. BUFFER ZONE:		00888.8 HA
410	01 ECOLOGICAL RATING:		11
00000640	010	01 NAME OF AREA:	WEST ISLAND
	020	01 STATE:	VIRGINIA
	021	01 COUNTY:	NEW KENT
	030	01 QUADRANGLE:	NEW KENT, VA
	040	01 SIZE OF AREA:	00476.7 HA
	060	01 OWNER I:	PRIVATE
	151	01 AQUATIC TYPES:	MARSH, FRESHWATER
170	01 BIOTIC COMPONENTS:		FRESHWATER MARSH VEGETATION. SWAMP FOREST, HARDWOODS. EAGLE NEST ACROSS FROM MARSH, NORTH OF SOUTHERN RAILROAD TRACK.
180	03 DESCRIPTION OF AREA:		IN PAMUNKEY AND YORK RIVERS WATERSHEDS. PRIME WETLANDS.
191	01 RARE AND ENDANGERED ANIMALS:		EAGLE NEST
410	01 ECOLOGICAL RATING:		11
00000670	010	01 NAME OF AREA:	GREEN BRIER SWAMP
	020	01 STATE:	MARYLAND
	021	01 COUNTY:	DORCHESTER
	030	01 QUADRANGLE:	BLACKWATER R., MD
	040	01 SIZE OF AREA:	01858.0 HA
	060	01 OWNER I:	PRIVATE
	151	01 AQUATIC TYPES:	SWAMP
170	01 BIOTIC COMPONENTS:		SWAMP FOREST, HARDWOODS AND TAXODIUM DISTICHUM. OTTER, TURKEY AND DELMARVA FOX SQUIRREL.
180	02 DESCRIPTION OF AREA:		AREA IS BEING DRAINED AND CLEARED.
191	01 RARE AND ENDANGERED ANIMALS:		DELMARVA FOX SQUIRREL
410	01 ECOLOGICAL RATING:		11
00000672	010	01 NAME OF AREA:	MATTAWOMAN CREEK
	020	01 STATE:	MARYLAND
	021	01 COUNTY:	CHARLES
	030	01 QUADRANGLE:	INDIAN HEAD, MD
	040	01 SIZE OF AREA:	01559.4 HA
	060	01 OWNER I:	STATE
	065	01 OWNER II:	PRIVATE
	170	01 BIOTIC COMPONENTS:	SWAMP FOREST, HARDWOODS, QUERCUS - CARVA. OTTER, MINK, OSPREY, BEAVER. NELUMBO SP. LARGEST CONCENTRATION OF NESTING WOOD DUCK IN MARYLAND.
180	01 DESCRIPTION OF AREA:		IN PCTOMAC RIVER WATERSHED. PART OF AREA IN MYRTLE GROVE WILDLIFE MANAGEMENT AREA AND GENERAL SMALLWOOD STATE PARK
	02		
	03		

DATE: 10/19/73

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

SERIAL CATEG LINE CAT-DEFINITION

DATA

00000672 200 01 CONTENTS IN MANUAL FILE:
400 01 AREA INCL. BUFFER ZONE;
410 01 ECOLOGICAL RATING;

00000687 010 01 NAME OF AREA:
020 01 STATE:
021 01 COUNTY:
030 01 QUADRANGLE:
040 01 SIZE OF AREA:
060 01 OWNER I:
151 01 AQUATIC TYPES:
170 01 BIOTIC COMPONENTS:

02 03
04
05
06
07
08
09
10
11

DESCRIPTION OF AREA:
180 01 RARE AND ENDANGERED ANIMALS:
400 01 AREA INCL. BUFFER ZONE;
410 01 ECOLOGICAL RATING;

010 01 NAME OF AREA:
020 01 STATE:
021 01 COUNTY:
030 01 QUADRANGLE:
040 01 SIZE OF AREA:
151 01 AQUATIC TYPES:
170 01 BIOTIC COMPONENTS:

02 03
04
05
06
07
08
09
10
11

DESCRIPTION OF AREA:
180 01 RARE AND ENDANGERED ANIMALS:
191 01 AREA INCL. BUFFER ZONE;
400 01 ECOLOGICAL RATING;

010 01 NAME OF AREA:
020 01 STATE:
021 01 COUNTY:
030 01 QUADRANGLE:
040 01 SIZE OF AREA:
060 01 OWNER I:
151 01 AQUATIC TYPES:
170 01 BIOTIC COMPONENTS:

02 03
04
05
06
07
08
09
10
11

DESCRIPTION OF AREA:
180 01 RARE AND ENDANGERED ANIMALS:
191 01 AREA INCL. BUFFER ZONE;
400 01 ECOLOGICAL RATING;

010 01 NAME OF AREA:
020 01 STATE:
021 01 COUNTY:
030 01 QUADRANGLE:
040 01 SIZE OF AREA:
060 01 OWNER I:
151 01 AQUATIC TYPES:
170 01 BIOTIC COMPONENTS:

02 03
04
05
06
07
08
09
10
11

DESCRIPTION OF AREA:
180 01 RARE AND ENDANGERED ANIMALS:
191 01 AREA INCL. BUFFER ZONE;

GENERAL INFORMATION
03947.1 HA
11

TUCKAHOE CREEK

MARYLAND
CAROLINE; TALBOT
FOWLING CREEK, MD; RIDGELY, MD
00989.8 HA
PRIVATE
MARSH. FRESHWATER MARSH WITH *TYPHA* SP., OTTER, OSPREY,
WOOD DUCK, ANADROMOUS FISH, STRIPED BASS SPAWNING,
WHITE SHAD, HICKORY SHAD, HERRING, *PINUS TAEDA*,
PTINUS VIRGINIANA, *QUERCUS* spp.
IN CHOPTANK RIVER WATERSHED. WOODED PORTIONS
INTERSPERSED WITH DEEP FRESH MARSHES. BEAUTIFUL
SHORELINE FOR 12 MILES ON BOTH SIDES OF TUCKAHOE
CREEK. PRIME WETLAND.

11

BROAD CREEK MARSH
VIRGINIA
RICHMOND; ESSEX
MOUNT LANDING, VA; CHAMPLAIN, VA
00206.0 HA
MARSH, TIDAL
HIGH TIDAL MARSH. PLANT SPECIES INCLUDE *SPARTINA*
PATENS, *DISTICHLIS* sp. AND *JUNCUS ROEMERIANUS*. OSPREY,
ANADROMOUS FISH, HERRING AND STRIPED BASS.
IN RAPPAHANNOCK RIVER WATERSHED. PRIME WETLANDS.
EAGLE NEST
01212.0 HA
11

DRAKES MARSH - OTTERBURN MARSH
VIRGINIA
WESTMORELAND; ESSEX
LORETTO, VA; CHAMPLAIN, VA
00488.8 HA
PRIVATE
MARSH, TIDAL, RIVER
HIGH TIDAL MARSH. PLANT SPECIES INCLUDE *SPARTINA*
PATENS, *DISTICHLIS* sp. AND *JUNCUS ROEMERIANUS*. EAGLE
NEST LOCATED ON SOUTH BANK OF RAPPAHANNOCK RIVER AT
EDGE OF COLEMAN CREEK. ANADROMOUS FISH.
IN RAPPAHANNOCK RIVER WATERSHED. PRIME WETLANDS.
EAGLE NEST

EAGLE NEST

DESCRIPTION OF AREA:
180 01 RARE AND ENDANGERED ANIMALS:
191 01 AREA INCL. BUFFER ZONE;

DESCRIPTION OF AREA:
180 01 RARE AND ENDANGERED ANIMALS:
191 01 AREA INCL. BUFFER ZONE;

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

DATE: 10/19/73

SERIAL CATEG LINE CAT-DEFINITION

DATA

00000719	400	01	AREA INCL. BUFFER ZONE:	00654.5 HA
	410	01	ECOLOGICAL RATING:	11
00000735	010	01	NAME OF AREA:	
	020	01	STATE:	WYE RIVER
	021	01	COUNTY:	MARYLAND
	030	01	QUADRANGLE:	QUEEN ANNE
	040	01	SIZE OF AREA:	QUEENSTOWN, MD
	060	01	OWNER I:	00141.4 HA
	151	01	AQUATIC TYPES:	PRIVATE
	170	01	BIOTIC COMPONENTS:	MARSH. TIDAL MARSH.
	180	02	DESCRIPTION OF AREA:	GEESE, ANADROMOUS FISH, STRIPED
	191	01	RARE AND ENDANGERED ANIMALS:	BASS. CRAB. OTTER.
	410	01	ECOLOGICAL RATING:	PRIME WETLANDS.
00000786	010	01	NAME OF AREA:	EAGLE NEST
	020	01	STATE:	11
	021	01	COUNTY:	LOWER MARSHYHOPE CREEK
	030	01	QUADRANGLE:	MARYLAND
	040	01	SIZE OF AREA:	DORCHESTER
	060	01	OWNER I:	RHODESDALE, MD
	170	01	AQUATIC TYPES:	00828.2 HA
	190	01	RARE AND ENDANGERED PLANTS:	PRIVATE
	410	01	ECOLOGICAL RATING:	SWAMP FOREST, CHAMAECYPARIS THYOIDES AND PINUS SP.
00000784	010	01	NAME OF AREA:	OTTER. NESTING WOOD DUCKS. ANADROMOUS FISH, STRIPED
	020	01	STATE:	BASS. HERRING. WHITE SHAD AND HICKORY SHAD.
	021	01	COUNTY:	ALNUS MARITIMA
	030	01	QUADRANGLE:	11
	040	01	SIZE OF AREA:	CHICAMUXEN CREEK
	060	01	OWNER I:	MARYLAND
	065	01	OWNER II:	CHARLES
	151	01	AQUATIC TYPES:	INDIAN HEAD, MD
	170	01	BIOTIC COMPONENTS:	00270.7 HA
	180	02	DESCRIPTION OF AREA:	FRESHWATER MARSH WITH TYPHA SP. AND SCIRPUS spp.
	191	01	RARE AND ENDANGERED ANIMALS:	MINK. OTTER. CRABS.
	400	01	AREA INCL. BUFFER ZONE:	ANADROMOUS FISH.
	410	01	ECOLOGICAL RATING:	IN POTOMAC RIVER WATERSHED
00000785	010	01	NAME OF AREA:	EAGLE NEST
	020	01	STATE:	00444.4 HA
	021	01	COUNTY:	11
	030	01	QUADRANGLE:	CHOPTANK RIVER (BRUCEVILLE)
	040	01	SIZE OF AREA:	MARYLAND
				TALBOT
				PRESTON, MD
				00218.2 HA

DATE: 10/19/73

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

SERIAL CATEG LINE CAT-DEFINITION

DATA

000000785 060 01 OWNER I;
151 01 AQUATIC TYPES!
170 01 BIOTIC COMPONENTS!
02
03
180 01 DESCRIPTION OF AREA:
02
03
04
200 01 CONTENTS IN MANUAL FILE:
410 01 ECOLOGICAL RATING!

PRIVATE
MARSH. FRESHWATER! RIVER
FRESHWATER MARSH WITH *TYPHA* SP. TERRAPIN. CRAB AND
OYSTER. ANADROMOUS FISH. STRIPED BASS. SHAD. CATFISH.
PERCH AND BULLHEADS SPAWNING AREA. OSPREY.
IN CHOPTANK RIVER WATERSHED. NO PRESERVATION IN
EFFECT. NO IMMINENT PROBLEMS. OUTSTANDING WILDLIFE
HABITAT OF TYPE RAPIDLY DISAPPEARING IN MARYLAND.
PRIME WETLAND.

WATER QUALITY INFORMATION
11

000000311 010 01 NAME OF AREA:
020 01 STATE:
021 01 COUNTY:
030 01 QUADRANGLE!
035 01 COORDINATES:
060 01 OWNER I;
170 01 BIOTIC COMPONENTS!
02
03
04
180 01 DESCRIPTION OF AREA:
02
03
200 01 CONTENTS IN MANUAL FILE:
400 01 AREA INCL. BUFFER ZONE!
410 01 ECOLOGICAL RATING!

HELEN CREEK HEMLOCK PRESERVE
MARYLAND
CALVERT
COVE POINT, MD! SOLOMONS ISLAND, MD, 7.5
38 22 -- N 076 27 -- W
NATURE CONSERVANCY. THE
SWAMP FOREST OF *TSUGA CANADENSIS*, *KALMIA LATIFOLIA*, *FAGUS*
GRANDIFOLIA, *QUERCUS* spp. AND *PINUS* spp. INTERMINGLED.
VIRGINIANA DOMINANT ON AREA FORMERLY CULTIVATED.
OTTER. CRAB AND TERRAPIN PRESENT.
STAND OF *TSUGA CANADENSIS* NEAR EDGE OF TIDAL MARSH
MARSH. MOST SOUTHERN KNOWN STAND OF HEMLOCK ALONG COAST.
MOST SOUTHERN KNOWN GROWTH OF *TSUGA CANADENSIS* ALONG COAST.
00331.3 HA

010 NOTE: SHOULD CONTINUE TO RECEIVE SPECIAL CONSIDERATION

000000612 010 01 NAME OF AREA:
020 01 STATE:
021 01 COUNTY:
030 01 QUADRANGLE!
040 01 SIZE OF AREA:
060 01 OWNER I;
151 01 AQUATIC TYPES!
170 01 BIOTIC COMPONENTS!
02
03
180 01 DESCRIPTION OF AREA!
191 01 RARE AND ENDANGERED ANIMALS!
400 01 AREA INCL. BUFFER ZONE!
410 01 ECOLOGICAL RATING!

POTOMAC CREEK
VIRGINIA
STAFFORD
FREDERICKSBURG, VA! PASSAPATANZY, VA
00537.3 HA
PRIVATE
MARSH. FRESHWATER
FRESHWATER MARSH VEGETATION. EAGLE. HERONRY.
ANADROMOUS FISH. HERRING.
IN POTOMAC RIVER WATERSHED.
EAGLE
02149.2 HA
10

000000616 010 01 NAME OF AREA:
020 01 STATE:
021 01 COUNTY:
030 01 QUADRANGLE!
040 01 SIZE OF AREA:

MORRIS CREEK MARSH
VIRGINIA
CHARLES CITY
BRANDON, VA
00452.5 HA

DATE: 10/19/73

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

SERIAL CATEG LINE CAT-DEFINITION

DATA

00000643 021 01 COUNTY:
030 01 QUADRANGLE:
040 01 SIZE OF AREA:
060 01 OWNER I:
151 01 AQUATIC TYPES:
170 01 BIOTIC COMPONENTS:
U2 DESCRIPTION OF AREA:
180 01 RARE AND ENDANGERED ANIMALS:
191 01 AREA INCL. BUFFER ZONE:
400 01 ECOLOGICAL RATING:
410 01 NAME OF AREA:
020 01 STATE:
021 01 COUNTY:
030 01 QUADRANGLE:
040 01 SIZE OF AREA:
060 01 OWNER I:
151 01 AQUATIC TYPES:
170 01 BIOTIC COMPONENTS:
180 01 DESCRIPTION OF AREA:
191 01 RARE AND ENDANGERED ANIMALS:
400 01 AREA INCL. BUFFER ZONE:
410 01 ECOLOGICAL RATING:
010 01 NAME OF AREA:
020 01 STATE:
021 01 COUNTY:
030 01 QUADRANGLE:
040 01 SIZE OF AREA:
060 01 OWNER I:
151 01 AQUATIC TYPES:
170 01 BIOTIC COMPONENTS:
180 01 DESCRIPTION OF AREA:
191 01 RARE AND ENDANGERED ANIMALS:
400 01 AREA INCL. BUFFER ZONE:
410 01 ECOLOGICAL RATING:
00000644 010 01 NAME OF AREA:
020 01 STATE:
021 01 COUNTY:
030 01 QUADRANGLE:
040 01 SIZE OF AREA:
060 01 OWNER I:
151 01 AQUATIC TYPES:
170 01 BIOTIC COMPONENTS:
180 01 DESCRIPTION OF AREA:
191 01 RARE AND ENDANGERED ANIMALS:
400 01 AREA INCL. BUFFER ZONE:
410 01 ECOLOGICAL RATING:
00000652 010 01 NAME OF AREA:
020 01 STATE:
021 01 COUNTY:
030 01 QUADRANGLE:
040 01 SIZE OF AREA:
060 01 OWNER I:
151 01 AQUATIC TYPES:
170 01 BIOTIC COMPONENTS:
180 01 DESCRIPTION OF AREA:
191 01 RARE AND ENDANGERED ANIMALS:
400 01 AREA INCL. BUFFER ZONE:
410 01 ECOLOGICAL RATING:
00000653 010 01 NAME OF AREA:
020 01 STATE:
021 01 COUNTY:
030 01 QUADRANGLE:
040 01 SIZE OF AREA:
060 01 OWNER I:
151 01 AQUATIC TYPES:
170 01 BIOTIC COMPONENTS:
180 01 DESCRIPTION OF AREA:
02 NAME OF AREA:
030 01 STATE:
031 01 COUNTY:
040 01 QUADRANGLE:
050 01 SIZE OF AREA:
060 01 OWNER I:
151 01 AQUATIC TYPES:
170 01 BIOTIC COMPONENTS:
180 01 DESCRIPTION OF AREA:
00 NEW KENT
NEW KENT, VA
00444•4 HA
PRIVATE
MARSH, FRESHWATER
FRESHWATER MARSH VEGETATION. SWAMP FOREST,
HARDWOODS. EAGLE NEST.
IN PAMUNKEY AND YORK RIVERS WATERSHEDS.
EAGLE NEST
00808•8 HA
10
ELTHAM MARSH
VIRGINIA
KING WILLIAM
WEST POINT, VA
00492•9 HA
PRIVATE
MARSH, TIDAL
HIGH TIDAL MARSH VEGETATION. OSPREY.
IN PAMUNKEY AND YORK RIVERS WATERSHEDS.
EAGLE NEST
00646•4 HA
10
HILL MARSH
VIRGINIA
NEW KENT
WEST POINT, VA
00545•4 HA
PRIVATE
MARSH, TIDAL
HIGH TIDAL MARSH VEGETATION. OSPREY. EAGLE NEST.
IN PAMUNKEY AND YORK RIVERS WATERSHEDS.
EAGLE NEST
00658•5 HA
10
LEE MARSH
VIRGINIA
KING WILLIAM
WEST POINT, VA
00634•3 HA
PRIVATE
MARSH, TIDAL
HIGH TIDAL MARSH VEGETATION. ANADROMOUS FISH.
IN PAMUNKEY AND YORK RIVERS WATERSHEDS. PRIME
WETLANDS.

DATE: 10/19/73

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

SERIAL CATEG LINE CAT-DEFINITION

DATA

00000653	191	01 RARE AND ENDANGERED ANIMALS:	EAGLE NEST
	400	01 AREA INCL. BUFFER ZONE:	00929.2 HA
	410	01 ECOLOGICAL RATING:	10
00000673	010	01 NAME OF AREA:	SWAN POINT NECK - WISE MARSH - NEALE SOUND - WEIR CREEK
	020	01 STATE:	MARYLAND
	021	01 COUNTY:	CHARLES
	030	01 QUADRANGLE:	MORGANTOWN, MD
	040	01 SIZE OF AREA:	00602.0 HA
	060	01 OWNER I:	PRIVATE
	151	01 AQUATIC TYPES:	MARSH, TIDAL
	170	01 BIOTIC COMPONENTS:	HIGH TIDAL MARSH WITH SPARTINA CYNOSUROIDES, OTTER, MINK, OSPREY, CRAB AND OYSTER, ANADROMOUS FISH, STRIPED BASS, OVERWINTERING SWAN.
	180	01 DESCRIPTION OF AREA:	IN POTOMAC RIVER WATERSHED.
	410	01 ECOLOGICAL RATING:	10
00000677	010	01 NAME OF AREA:	WAREHOUSE CREEK
	020	01 STATE:	MARYLAND
	021	01 COUNTY:	QUEEN ANNE
	030	01 QUADRANGLE:	KENT ISLAND, MD
	040	01 SIZE OF AREA:	00315.1 HA
	060	01 OWNER I:	PRIVATE
	151	01 AQUATIC TYPES:	MARSH, TIDAL
	170	01 BIOTIC COMPONENTS:	HIGH TIDAL MARSH WITH PHRAGMITES SP., OSPREY, OTTER, ANADROMOUS FISH, STRIPED BASS, RICH IN BIRD LIFE.
	180	01 DESCRIPTION OF AREA:	ABUNDANT SHELLFISH. WINTERING WHISTLING SWAN. LONG, LOW LYING PENINSULA WITH NUMEROUS BAYS, CREEKS, COVES AND LAGOONS. AREA IS OF KEY IMPORTANCE TO BIRD MIGRATION PATTERNS.
	410	01 ECOLOGICAL RATING:	10
00000679	010	01 NAME OF AREA:	HOWELL POINT
	020	01 STATE:	MARYLAND
	021	01 COUNTY:	KENT
	030	01 QUADRANGLE:	BETTERTON, MD
	040	01 SIZE OF AREA:	00222.2 HA
	060	01 OWNER I:	PRIVATE
	151	01 AQUATIC TYPES:	SWAMP
	170	01 BIOTIC COMPONENTS:	SWAMP FOREST, HARDWOODS, OTTER, OSPREY, WOOD DUCK, ANADROMOUS FISH, SHAD, HERRING, STRIPED BASS.
	180	01 DESCRIPTION OF AREA:	PRIME WETLAND.
	400	01 AREA INCL. BUFFER ZONE:	00711.0 HA
	410	01 ECOLOGICAL RATING:	10
00000685	010	01 NAME OF AREA:	KINGS CREEK - KINGSTON LANDING
	020	01 STATE:	MARYLAND
	021	01 COUNTY:	TALBOT

DATE: 10/19/73

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

SERIAL CATEG LINE CAT-DEFINITION

DATA

SERIAL	CATEG	LINE	CAT-DEFINITION	DATA
00000685	030	01	QUADRANGLE;	FOWLING CREEK, MD
	040	01	SIZE OF AREA:	00767.6 HA
	060	01	OWNER I:	PRIVATE
	151	01	AQUATIC TYPES:	FRESHWATER MARSH WITH TYPHA SP. SWAMP FOREST.
	170	01	BIOTIC COMPONENTS:	CHAMAECYPARIS THYOIDES. OTTER. ANADROMOUS FISH. STRIPED BASS. WHITE SHAD. HICKORY SHAD. HERRING.
	02		DESCRIPTION OF AREA:	IN CHOPTANK RIVER WATERSHED.
	03		ECOLOGICAL RATING:	PRIME WETLAND.
	180	01	NAME OF AREA:	NOTE: AREA SHOULD RECEIVE SPECIAL CONSIDERATION
	410	01	STATE:	10
00000691	010	01	STATE:	REWASTICO CREEK - ROUND ISLAND - FERRY POINT
	020	01	COUNTY:	MARYLAND
	021	01	QUADRANGLE:	WICOMICO
	030	01	SIZE OF AREA:	MARDELLA SPRINGS, MD
	040	01	OWNER I:	01923.0 HA
	060	01	AQUATIC TYPES:	PRIVATE
	151	01	BIOTIC COMPONENTS:	MARSH. TIDAL
	170	01	ECOLOGICAL RATING:	HIGH TIDAL MARSH. OSPREY. OTTER. ANADROMOUS FISH, STRIPED BASS. WHITE SHAD. HICKORY SHAD. ALEWIFE.
	02		DESCRIPTION OF AREA:	IN NANTICOKE RIVER WATERSHED.
	03		ECOLOGICAL RATING:	PRIME WETLANDS.
	180	01	NAME OF AREA:	10
	410	01	STATE:	
00000695	010	01	STATE:	BARKERS CREEK
	020	01	COUNTY:	MARYLAND
	021	01	QUADRANGLE:	TALBOT
	030	01	SIZE OF AREA:	MD; PRESTON, MD
	040	01	AQUATIC TYPES:	00153.5 HA
	151	01	BIOTIC COMPONENTS:	NARSH. FRESHWATER
	170	01	ECOLOGICAL RATING:	FRESHWATER MARSH WITH TYPHA SP. DELMARVA FOX SQUIRREL. OSPREY. ANADROMOUS FISH, STRIPED BASS SPAWNING.
	02		DESCRIPTION OF AREA:	IN CHOPTANK WATERSHED.
	180	01	RARE AND ENDANGERED ANIMALS:	DELMARVA FOX SQUIRREL
	191	01	NAME OF AREA:	10
	410	01	STATE:	
00000703	010	01	STATE:	BELL SWAMP - OWEN POND
	020	01	COUNTY:	VIRGINIA
	021	01	QUADRANGLE:	NORTHUMBERLAND
	030	01	SIZE OF AREA:	REEDVILLE, VA
	040	01	OWNER I:	00347.4 HA
	060	01	AQUATIC TYPES:	PRIVATE
	151	01	BIOTIC COMPONENTS:	POND
	170	01	RARE AND ENDANGERED ANIMALS:	SWAMP FOREST, HARDWOODS. OSPREY.
	191	01	NAME OF AREA:	EAGLE NEST
	410	01	STATE:	10
00000707	010	01	NAME OF AREA:	LITTLE CARTER CREEK MARSH
	020	01	STATE:	VIRGINIA

DATE: 10/19/73

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

SERIAL CATEG LINE CAT-DEFINITION

DATA

00000707	021	01	COUNTY! QUADRANGLE! SIZE OF AREA! OWNER !: BIOTIC COMPONENTS!	RICHMOND TAPPAHANNOCK, VA 00892•8 HA PRIVATE HIGH TIDAL MARSH. SPARTINA CYNOSUROIDES. ANADROMOUS FISH. HERRING AND STRIPED BASS. IN RAPPAHANNOCK WATERSHED. PRIME WETLANDS.
	180	01	DESCRIPTION OF AREA! RARE AND ENDANGERED ANIMALS! AREA INCL. BUFFER ZONE!	EAGLE NEST
	191	01		02424.0 HA
	400	01		10
	410	01	ECOLOGICAL RATING:	
00000711	010	01	NAME OF AREA! STATE! COUNTY! QUADRANGLE! SIZE OF AREA! OWNER !: BIOTIC COMPONENTS!	PERSIMMON POINT VIRGINIA KING GEORGE DAHLGREN, VA 00210•1 HA PRIVATE UPLAND PINE SUCCESSIONAL COMMUNITY. UPLAND MATURE HARDWOODS. EAGLE. OVERWINTERING SWANS AND CANVASBACK DUCKS. PINUS PALUSTRIS.
	020	01		EAGLE NEST
	021	01		00630•2 HA
	030	01		10
	040	01		
	060	01		
	170	01		
	191	01	RARE AND ENDANGERED ANIMALS! AREA INCL. BUFFER ZONE!	
	400	01		
	410	01	ECOLOGICAL RATING:	
00000717	010	01	NAME OF AREA! STATE! COUNTY! QUADRANGLE! SIZE OF AREA! OWNER !: AQUATIC TYPES! BIOTIC COMPONENTS!	CLEVE MARSH VIRGINIA KING GEORGE PORT ROYAL, VA 00391•9 HA PRIVATE MARSH. FRESHWATER! RIVER FRESHWATER MARSH SPECIES. EAGLE NESTS ACROSS RIVER FROM MARSH. ANADROMOUS FISH. IN RAPPAHANNOCK RIVER WATERSHED. PRIME WETLANDS.
	020	01		EAGLE NEST
	021	01		00412. 1 HA
	030	01		10
	040	01		
	060	01		
	151	01		
	170	01		
	191	01	DESCRIPTION OF AREA! RARE AND ENDANGERED ANIMALS! AREA INCL. BUFFER ZONE!	
	400	01		
	410	01	ECOLOGICAL RATING:	
00000773	010	01	NAME OF AREA! STATE! COUNTY! QUADRANGLE! SIZE OF AREA! OWNER !: AQUATIC TYPES! BIOTIC COMPONENTS!	SWAN POINT - TAVERN CREEK MARYLAND KENT SWAN POINT, MD 00242•4 HA PRIVATE MARSH. TIDAL HIGH TIDAL MARSH. PLANT SPECIES INCLUDE SPARTINA PATENS, DISTICHLIS SP. AND JUNCUS ROEMERIANUS. OTTER, OSPREY AND NESTING WOOD DUCKS. ANADROMOUS FISH.
	020	01		
	021	01		
	030	01		
	040	01		
	060	01		
	151	01		
	170	01		
	191	01		
	400	01		
	410	01		
	02	03		

DATE: 10/19/73

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

SERIAL CATEG LINE CAT-DEFINITION

DATA

00000773	170	04	DESCRIPTION OF AREA: ECOLOGICAL RATING:	STRIPED BASS. CRABS. OYSTERS. PRIME WETLAND.
	180	01		10
	410	01		
00000776	010	01	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA:	ST. MARY'S RIVER MARYLAND ST. MARY'S ST. MARY'S CITY. MD 00125•2 HA
	020	01	OWNER I: AQUATIC TYPES: BIOTIC COMPONENTS: DESCRIPTION OF AREA:	PRIVATE MARSH. FRESHWATER FRESHWATER MARSH WITH TYPHA SP. MINK. NESSING WOOD DUCKS. ARCHAEOLOGICAL EXCAVATION OF RUINS OF 17TH CENTURY HOME OF CHARLES CALVERT, COLONIAL GOVERNOR OF MARYLAND.
	021	01		
	030	01		
	040	01		
	060	01		
	151	01		
	170	01		
	180	01		
	191	01	RARE AND ENDANGERED ANIMALS: ECOLOGICAL RATING:	EAGLE NEST 10
	410	01		
00000781	010	01	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA:	NICHOLS POINT MARYLAND KENT LANGFORD CREEK. MD 00064•6 HA
	020	01	OWNER I: AQUATIC TYPES: BIOTIC COMPONENTS:	PRIVATE MARSH. TIDAL HIGH TIDAL MARSH. PLANT SPECIES INCLUDE SPARTINA PATENS, DISTICHLIS SP. AND JUNCUS ROEMERIANUS. OTTER. OSPREY. CRABS. OYSTER. NESTING WOOD DUCKS. OVERWINTERING WHISTLING SWAN.
	021	01		
	030	01		
	040	01		
	060	01		
	151	01		
	170	01		
	180	01	DESCRIPTION OF AREA: ECOLOGICAL RATING:	PRIME WETLANDS. 10
	410	01		
00000828	010	01	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA:	MATTAWOMAN CREEK. UPPER MARYLAND CHARLES. PRINCE GEORGES PISCATAWAY 00686•8 HA
	020	01	OWNER I: AQUATIC TYPES: BIOTIC COMPONENTS:	PRIVATE SWAMP FOREST. HARDWOODS. OTTER. MINK. OSPREY, BEAVER AND WOOD DUCK. ANADROMOUS FISH. HERONRY.
	021	01		
	030	01		
	040	01		
	060	01		
	151	01		
	170	01		
	180	01		
	410	01	ECOLOGICAL RATING:	10
00000829	010	01	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA:	CHOPAWAMSIC CREEK VIRGINIA PRINCE WILLIAM. STAFFORD QUINTICO. VA 01442•3 HA FEDERAL
	020	01	OWNER I:	
	021	01		
	030	01		
	040	01		
	060	01		

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

DATE: 10/19/73

SERIAL CATEG LINE CAT-DEFINITION

DATA

SERIAL	CATEG LINE	CAT-DEFINITION	DATA
000000829	151 01	AQUATIC TYPES! BIOTIC COMPONENTS! ECOLOGICAL RATING!	MARSH, FRESHWATER FRESHWATER MARSH. ANADROMOUS FISH. HERONRY. 10
000000619	010 01	NAME OF AREA: STATE; COUNTY;	GRAYS CREEK MARSH VIRGINIA
	020 01	QUADRANGLE;	SURRY
	030 01	COORDINATES:	SURRY, VA 37 10 -- N 076 47 32 W
	035 01	SIZE OF AREA:	00456.5 HA
	040 01	OWNER I:	PRIVATE
	060 01	AQUATIC TYPES: BIOTIC COMPONENTS:	HIGH TIDAL MARSH VEGETATION. SWAMP FOREST, HARDWOODS, TAXODIUM DISTICHUM. ANADROMOUS FISH, HERRING. TYpha SP. PELTANDRA SP. SPARTINA SP., PONTEDERIA SP. AND KALMIA SP.
	170 01		IN JAMES RIVER WATERSHED 03211.8 HA 09
	180 01	DESCRIPTION OF AREA: AREA INCL. BUFFER ZONE:	CHAPTICO RUN
	400 01	ECOLOGICAL RATING!	MARYLAND
	410 01		ST. MARY'S ROCK POINT, VA 00218.2 HA
00000656	010 01	NAME OF AREA: STATE; COUNTY;	PRIVATE
	020 01	QUADRANGLE!	MARSH. TIDAL MARSH. FRESHWATER HIGH TIDAL MARSH WITH SPARTINA CYNOSEQUIDES. FRESHWATER MARSH WITH TYPHA SP. OSPREY, BEAVER,
	021 01	SIZE OF AREA:	OTTER, MINK AND TERRAPIN PRESENT. CRABS. ANADROMOUS
	030 01	OWNER I:	FISH, SHAD, HERRING. WOOD DUCK.
	040 01	AQUATIC TYPES: BIOTIC COMPONENTS:	IN POTOMAC RIVER WATERSHED. 00404.0 HA 09
	151 01		
	170 01		
	180 01	DESCRIPTION OF AREA: AREA INCL. BUFFER ZONE:	COVE POINT
	400 01	ECOLOGICAL RATING!	MARYLAND
	410 01		CALVERT
	010 01	NAME OF AREA: STATE; COUNTY;	COVE POINT, MD
	020 01	QUADRANGLE!	00084.8 HA
	021 01	SIZE OF AREA:	PRIVATE
	030 01	OWNER I:	MARSH. TIDAL
	040 01	AQUATIC TYPES: BIOTIC COMPONENTS:	TIDAL MARSH WITH PHRAGMITES. OTTER. NORTHERNMOST
	151 01		POINT OF DISTRIBUTION FOR NARROWMOUTH FROG.
	170 01		EAGLE NEST
	191 01	RARE AND ENDANGERED ANIMALS:	00214.1 HA 09
	400 01	AREA INCL. BUFFER ZONE:	FLAT CREEK
	410 01	ECOLOGICAL RATING!	
00000668	010 01	NAME OF AREA: STATE; COUNTY;	
	020 01	QUADRANGLE!	
	021 01	SIZE OF AREA:	
	030 01	OWNER I:	
	040 01	AQUATIC TYPES: BIOTIC COMPONENTS:	
	151 01		
	170 01		
	191 01	RARE AND ENDANGERED ANIMALS:	
	400 01	AREA INCL. BUFFER ZONE:	
	410 01	ECOLOGICAL RATING!	
	010 01	NAME OF AREA:	

CHEESAPEAKE BAY SURVEY REPORT
MASTER LIST

DATE: 10/19/73

SERIAL CATEG LINE CAT=DEFINITION

DATA

SERIAL	CATEG	LINE	CAT=DEFINITION	DATA
000000669	020	01	STATE!	
	021	01	COUNTY!	
	030	01	QUADRANGLE!	
	040	01	SIZE OF AREA!	
	060	01	OWNER I!	
	151	01	AQUATIC TYPES!	
	170	01	BIOTIC COMPONENTS!	
	02	01	DESCRIPTION OF AREA!	
	180	01	AREA INCL. BUFFER ZONE!	
	400	01	ECOLOGICAL RATING!	
	410	01		
000000675	010	01	NAME OF AREA!	
	020	01	STATE!	
	021	01	COUNTY!	
	030	01	QUADRANGLE!	
	040	01	SIZE OF AREA!	
	060	01	OWNER I!	
	151	01	AQUATIC TYPES!	
	170	01	BIOTIC COMPONENTS!	
	02	01	RARE AND ENDANGERED ANIMALS!	
	191	01	AREA INCL. BUFFER ZONE!	
	400	01	ECOLOGICAL RATING!	
	410	01		
000000678	010	01	NAME OF AREA!	
	020	01	STATE!	
	021	01	COUNTY!	
	030	01	QUADRANGLE!	
	040	01	SIZE OF AREA!	
	060	01	OWNER II!	
	151	01	AQUATIC TYPES!	
	170	01	BIOTIC COMPONENTS!	
	02	01	DESCRIPTION OF AREA!	
	180	01	ECOLOGICAL RATING!	
	410	01		
000000682	010	01	NAME OF AREA!	
	020	01	STATE!	
	021	01	COUNTY!	
	030	01	QUADRANGLE!	
	040	01	SIZE OF AREA!	
	060	01	OWNER II	
	151	01	AQUATIC TYPES!	
	170	01	BIOTIC COMPONENTS!	
	02	01	DESCRIPTION OF AREA!	
	180	01		

MARYLAND
ANNE ARUNDEL
SOUTH RIVER, MD
00121.1 HA
PRIVATE
FRESHWATER MARSH WITH TYPHA SP. MATURE FAGUS GRANDIFOLIA
WOODS. WOOD DUCK. CRABS AND CLAMS. OSPREY.
IN SOUTH RIVER WATERSHED.
03212.1 HA
09

FISHING CREEK
MARYLAND
CALVERT
CLAIBORNE, MD
00355.5 HA
PRIVATE
MARSH. TIDAL MARSH.
HIGH TIDAL MARSH.
EAGLE. WOOD DUCK.
EAGLE NEST
01414.0 HA
09

DEEP LANDING
MARYLAND
CALVERT
BENEDICT, MD
00080.8 HA
PRIVATE
FRESHWATER MARSH. WITH TYPHA SP. MINK. OTTER. WILSON
SNipe. CANVASBACK. GREAT BLUE HERON NESTING.
ANADROMOUS FISH. HERRING. SHAD. CRAB.
IN PATUXENT WATERSHED. PRIME WETLAND.
09

SOUTH MARSH ISLAND
MARYLAND
SOMERSET
KEDGES STRAITS. MD!
01224.1 HA
PRIVATE
MARSH. TIDAL MARSH. CLAPPER RAIL. TERRAPIN. OSPREY.
ANADROMOUS FISH. STRIPED BASS. CRAB. CLAM. OYSTER.
PRIME WETLANDS.

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

DATE: 10/19/73

SERIAL CATEG LINE CAT-DEFINITION

DATA

000000682	400	01	AREA INCL. BUFFER ZONE: ECOLOGICAL RATING:	01939.2 HA 09
000000683	010	01	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I: AQUATIC TYPES: BIOTIC COMPONENTS:	BURGESS CREEK MARYLAND CHARLES MATHIAS POINT, MD 00319.2 HA PRIVATE MARSH, FRESHWATER FRESHWATER MARSH WITH TYPHA SP. ANADROMOUS FISH, HERRING, CRAB. IN POTOMAC WATERSHED.
	020	01	DESCRIPTION OF AREA: RARE AND ENDANGERED ANIMALS:	
	030	01	AREA INCL. BUFFER ZONE: ECOLOGICAL RATING:	EAGLE NEST 01090.8 HA 09
000000701	010	01	NAME OF AREA: STATE: COUNTY: QUADRANGLE:	DOGUE CREEK, UPPER VIRGINIA FAIRFAX BELVOIR, VA; ANNANDALE, VA; ALEXANDRIA, VA; MT.
	020	01	SIZE OF AREA: OWNER I: OWNER II: OWNER III: BIOTIC COMPONENTS:	00779.7 HA PRIVATE FEDERAL, MILITARY SWAMP FOREST, HARDWOODS. UPLAND PINE, SUCCESSIONAL. IN POTOMAC WATERSHED.
	030	01	DESCRIPTION OF AREA: ECOLOGICAL RATING:	09
000000724	010	01	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I: AQUATIC TYPES: BIOTIC COMPONENTS: DESCRIPTION OF AREA: RARE AND ENDANGERED PLANTS: ECOLOGICAL RATING:	HERRING CREEK MARSH VIRGINIA CHARLES CITY WESTOVER, VA 00375.7 HA PRIVATE MARSH, FRESHWATER ANADROMOUS FISH, HERRING. IN JAMES RIVER WATERSHED. CASSIA FASCICULATA VAR. MACROSPERMA 09
	020	01	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I:	CHESTNUT POINT MARYLAND ANNE ARUNDEL DEAL, MD 00157.6 HA PRIVATE
	030	01		
	040	01		
	060	01		
	170	01		
	180	01		
	190	01		
	410	01		
000000776	010	01		
	020	01		
	021	01		
	030	01		
	040	01		
	060	01		

DATE: 10/19/73

CHEESAPEAKE BAY SURVEY REPORT
MASTER LIST

SERIAL CATEG LINE CAT-DEFINITION

DATA

00000776	065	01	OWNER I; AQUATIC TYPES: BIOTIC COMPONENTS:	FEDERAL • AGENCY MARSH, TIDAL HIGH TIDAL MARSH. PLANT SPECIES INCLUDE SPARTINA PATENS, DISTICHLIS SP. AND JUNCUS ROEMERIANUS. OTTER, MINK, OSPREY. ANADROMOUS FISH, ALEWIVES. CRABS, CLAMS AND OYSTERS. OVERWINTERING SWAN. SANDY POINT.
	151	01		
	170	01		
	02			
	03			
	04			
	180	01	DESCRIPTION OF AREA: ECOLOGICAL RATING:	
	410	01		
00000771	010	01	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA:	SAVANNAH LAKE MARYLAND DORCHESTER CHICAMACOMICO, MD; NANTICOKE, MD 00337•3 HA PRIVATE
	020	01		
	021	01		
	030	01		
	040	01		
	060	01		
	151	01		
	170	01		
	02			
	03			
	04			
	180	01	DESCRIPTION OF AREA: ECOLOGICAL RATING:	
	410	01		
00000791	010	01	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA:	MORGAN CREEK MARYLAND KENT BETTERTON, MD; CHESTERTOWN, MD 00440•4 HA PRIVATE
	020	01		
	021	01		
	030	01		
	040	01		
	060	01		
	151	01		
	170	01		
	02			
	03			
	04			
	05			
	410	01	DESCRIPTION OF AREA: AREA INCL. BUFFER ZONE: ECOLOGICAL RATING:	
00000830	010	01	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA:	GAMBO CREEK MARSH VIRGINIA KING GEORGE DAHLGREEN, VA 00117•2 HA U.S. NAVAL RESERVOIR
	020	01		
	021	01		
	030	01		
	040	01		
	060	01		
	151	01		
	170	01		

DATE: 10/19/73

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

SERIAL CATEG LINE CAT-DEFINITION

DATA

000000830 170 02 ECOLOGICAL RATING:
410 01 ONE AND ONE HALF MILES AWAY.
09

000000606 010 01 NAME OF AREA:
020 01 STATE:
021 01 COUNTY:
030 01 QUADRANGLE:
040 01 SIZE OF AREA:
060 01 OWNER 1;
170 01 BIOTIC COMPONENTS:
02 DESCRIPTION OF AREA:
180 01 ECOLOGICAL RATING:
410 01

MATTAPONI RIVER, UPPER
VIRGINIA
KING WILLIAM; KING AND QUEEN
AYLETT, VA; YORK, VA
02496•7 HA
PRIVATE
SWAMP FOREST, HARDWOODS, TAXODIUM DISTICHUM.
ANADROMOUS FISH, STRIPED BASS, HERRING.
IN YORK RIVER WATERSHED.
08

000000633 010 01 NAME OF AREA:
020 01 STATE:
021 01 COUNTY:
030 01 QUADRANGLE:
040 01 SIZE OF AREA:
060 01 OWNER 1;
151 01 AQUATIC TYPES;
170 01 BIOTIC COMPONENTS:
02 DESCRIPTION OF AREA:
180 01 AREA INCL. BUFFER ZONE:
400 01 ECOLOGICAL RATING:
410 01

PISCATAWAY CREEK MARSH
VIRGINIA
ESSEX
MOUNT LANDING, VA; TAPPAHANNOCK, VA; DUNNSVILLE, VA;
MILLERS TAVERN, VA
00900.9 HA
PRIVATE
MARSH, TIDAL
HIGH TIDAL MARSH VEGETATION, OSPREY. ANADROMOUS
FISH, HERRING, STRIPED BASS.
IN RAPPAHANNOCK RIVER WATERSHED. PRIME WETLAND.
02710.8 HA
08

000000641 010 01 NAME OF AREA:
020 01 STATE:
021 01 COUNTY:
030 01 QUADRANGLE:
040 01 SIZE OF AREA:
060 01 OWNER 1;
151 01 AQUATIC TYPES;
170 01 BIOTIC COMPONENTS:
180 01 DESCRIPTION OF AREA:
410 01 ECOLOGICAL RATING:
01

BIG MARSH - TOBASCO ISLAND - SAVAGE ISLAND
VIRGINIA
ACCOMACK
CHESAPEAKE, VA
03094•6 HA
PRIVATE
MARSH, TIDAL
HIGH TIDAL MARSH VEGETATION.
PRIME WETLANDS.
08

000000658 010 01 NAME OF AREA:
020 01 STATE:
021 01 COUNTY:
030 01 QUADRANGLE:
040 01 SIZE OF AREA:
060 01 OWNER 1;
151 01 AQUATIC TYPES;
170 01 BIOTIC COMPONENTS:
180 01 DESCRIPTION OF AREA:
410 01 ECOLOGICAL RATING:
02

DEEP COVE CREEK
MARYLAND
ANNE ARUNDEL
DEALE, MD
00141•4 HA
PRIVATE
MARSH, TIDAL
HIGH TIDAL MARSH WITH SPARTINA CYNOSEOIDES. OTTER, MINK,
TERRAPIN, OSPREY, CRAB, CLAM AND OYSTERS. ANADROMOUS FISH.
02

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

DATE: 10/19/73

SERIAL CATEG LINE CAT-DEFINITION

DATA

00000658 170 03 ECOLOGICAL RATING:
410 01

NAME OF AREA:
STATE:
COUNTY:
QUADRANGLE:
SIZE OF AREA:
OWNER I:
AQUATIC TYPES:
BIOTIC COMPONENTS:
170 01

DESCRIPTION OF AREA:

020 01 AREA INCL. BUFFER ZONE:
030 01 ECOLOGICAL RATING:
410 01

NAME OF AREA:
STATE:
COUNTY:
QUADRANGLE:
SIZE OF AREA:
OWNER I:
AQUATIC TYPES:
BIOTIC COMPONENTS:
151 01
170 01
410 01

ECOLOGICAL RATING:
010 01
020 01 NAME OF AREA:
021 01 STATE:
030 01 COUNTY:
040 01 QUADRANGLE:
060 01 SIZE OF AREA:
060 01 OWNER I:
151 01 AQUATIC TYPES:
170 01 BIOTIC COMPONENTS:
410 01

NAME OF AREA:
STATE:
COUNTY:
QUADRANGLE:
SIZE OF AREA:
OWNER I:
AQUATIC TYPES:
010 01
020 01
021 01
030 01
040 01
060 01
151 01

STRIPED BASS.
08

PRINCPIO CREEK
MARYLAND
CECIL
HAVRE DE GRACE, VA
00080.8 HA
PRIVATE
MARSH. FRESHWATER
FRESHWATER MARSH WITH SCIRPUS spp., TYPHA spp., ALNUS
SP., SALIX sp., AND ROSA SP. OTTER, CRAB, WOOD DUCK,
GEESE, AND SWAN, OVERWINTERING. ANADROMOUS FISH, SHAD.
OF HISTORIC INTEREST IS THE IRON WORKS, ESTABLISHED
1715, OPERATED UNTIL 1910. VANDALISM IS A PROBLEM IN
THE AREA.
00222.2 HA
08

HOOD POINT - PINEY POINT - MARSHY CREEK
MARYLAND
QUEEN ANNE
QUEENSTOWN, MD
00250.5 HA
PRIVATE
MARSH, TIDAL
HIGH TIDAL MARSH VEGETATION. OTTER, TERRAPIN, OSPREY,
CRABS AND OYSTERS. ANADROMOUS FISH, STRIPED BASS.
08

KENT POINT
MARYLAND
QUEEN ANNE
CLAIBORNE, MD
00072.7 HA
PRIVATE
POND
OSPREY, CRABS, PUDDLE DUCK CONCENTRATION.
ANADROMOUS FISH, STRIPED BASS.
08

CABIN JOHN CREEK MARSHES
MARYLAND
CECIL
EARLEVILLE, MD
00290.9 HA
PRIVATE
MARSH, FRESHWATER

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

DATE: 10/19/73

SERIAL CATEG LINE CAT-DEFINITION

DATA

00000667	170	01 BIOTIC COMPONENTS:	FRESHWATER MARSH WITH SCIRPUS spp. OTTER. OVERWINTERING SWAN. HERONRY WITH ABOUT 150 NESTS. CRAB. ANADROMOUS FISH. IN ELK RIVER WATERSHED.
	02		
	03	DESCRIPTION OF AREA: AREA INCL. BUFFER ZONE; ECOLOGICAL RATING:	00214.1 HA 08
00000680	010	01 NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I: AQUATIC TYPES: BIOTIC COMPONENTS:	LANGFORD MARSH - RICHARDSON MARSH - MARUMSLO CREEK MARYLAND SOMERSET SAXIS, MD! 01478.6 HA PRIVATE MARSH. TIDAL HIGH TIDAL MARSH. OTTER, MINK, ANADROMOUS FISH, STRIPED BASS, HERRING, WHITE SHAD. CRAB, CLAMS AND OYSTER. IN POCOMOKE RIVER WATERSHED. PRIME WETLAND 08
	020		
	021		
	030		
	040		
	060		
	151		
	170		
	02	DESCRIPTION OF AREA: ECOLOGICAL RATING:	
	03		
	180		
	410		
00000684	010	01 NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I: AQUATIC TYPES: BIOTIC COMPONENTS:	HELL HOOK MARSH - WORLDS END CREEK MARYLAND DORCHESTER HONGA, MD 01607.9 HA PRIVATE MARSH. TIDAL HIGH TIDAL MARSH. TERRAPIN, OTTER, TURKEY, BLUE CRABS, CLAMS, OYSTERS, RUPPIA OCCIDENTALIS AND EEL GRASS. SUPERB MARSH. UNSPOILED. IMPORTANT COMMERCIAL SHELLFISH AREA. PRIME WETLAND. 02052.3 HA 08
	020		
	021		
	030		
	040		
	060		
	151		
	170		
	02	DESCRIPTION OF AREA: AREA INCL. BUFFER ZONE; ECOLOGICAL RATING:	
	03		
	180		
	400		
	410		
00000688	010	01 NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I: AQUATIC TYPES: BIOTIC COMPONENTS:	NUTTERS NECK MARYLAND WICOMICO WETIPQUIN, MD! MARDELLA SPRINGS, MD 00674.7 HA PRIVATE MARSH. FRESHWATER FRESHWATER MARSH WITH TYPHA SP. OTTER, ANADROMOUS FISH, STRIPED BASS, WHITE SHAD, HICKORY SHAD, ALEWIFE, CRAB. IN NANTICOKE RIVER WATERSHED. PRIME WETLAND. 08
	020		
	021		
	030		
	040		
	060		
	151		
	170		
	02	DESCRIPTION OF AREA: ECOLOGICAL RATING:	
	03		
	180		
	410		
00000699	010	01 NAME OF AREA!	PICCOWAXEN CREEK

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

DATE: 10/19/73

SERIAL CATEG LINE CAT-DEFINITION

DATA

000000699	020	01 STATE:	MARYLAND
	021	01 COUNTY:	CHARLES
	030	01 QUADRANGLE:	COLONIAL BEACH NORTH, MD
	040	01 SIZE OF AREA:	00097.0 HA
	151	01 AQUATIC TYPES:	MARSH, TIDAL
	170	01 BIOTIC COMPONENTS:	HIGH TIDAL MARSH WITH SPARTINA CYNOSUROIDES. MINK, OTTER, ANADROMOUS FISH, STRIPED BASS, OSPREY.
	180	01 DESCRIPTION OF AREA:	IN POTOMAC RIVER WATERSHED.
	410	01 ECOLOGICAL RATING:	08
000000706	010	01 NAME OF AREA:	CATLETT ISLANDS
	020	01 STATE:	VIRGINIA
	021	01 COUNTY:	GLOUCESTER
	030	01 QUADRANGLE:	CLAY BANK, VA
	040	01 SIZE OF AREA:	00258.6 HA
	060	01 OWNER I:	PRIVATE
	170	01 BIOTIC COMPONENTS:	SWAMP FOREST, HARDWOODS. PINUS TAEDA, JUNIPERUS VIRGINIANA. HIGH TIDAL MARSH WITH SPARTINA ALTERNIFLORA AND JUNCUS ROEMERIANUS. OSPREY.
	400	01 AREA INCL. BUFFER ZONE:	00525.2 HA
	410	01 ECOLOGICAL RATING:	08
000000726	010	01 NAME OF AREA:	LILLEYS NECK
	020	01 STATE:	VIRGINIA
	021	01 COUNTY:	MATHEWS
	030	01 QUADRANGLE:	MATHEWS, VA
	040	01 SIZE OF AREA:	00105.0 HA
	060	01 OWNER I:	PRIVATE
	151	01 AQUATIC TYPES:	MARSH, TIDAL
	170	01 BIOTIC COMPONENTS:	UPLAND MATURE HARDWOODS. UPLAND PINES, SUCCESSIONAL. OSPREY.
	400	01 AREA INCL. BUFFER ZONE:	00117.2 HA
	410	01 ECOLOGICAL RATING:	08
020000732	010	01 NAME OF AREA:	SKELETON CREEK
	020	01 STATE:	MARYLAND
	021	01 COUNTY:	CAROLINE
	030	01 QUADRANGLE:	PRESTON, MD
	040	01 SIZE OF AREA:	00161.6 HA
	060	01 OWNER I:	PRIVATE
	151	01 AQUATIC TYPES:	MARSH, FRESHWATER ANADROMOUS FISH, STRIPED BASS, WHITE SHAD, HICKORY SHAD, HERRING.
	170	01 BIOTIC COMPONENTS:	IN CHOPTANK RIVER WATERSHED. PRIME WETLAND.
	180	01 DESCRIPTION OF AREA:	08
	410	01 ECOLOGICAL RATING:	BLINKHORN CREEK
000000742	010	01 NAME OF AREA:	

**CHESAPEAKE BAY SURVEY REPORT
MASTER LIST**

DATE: 10/19/73

SERIAL CATEG | INE CAT=DEFINITION

DATA

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

DATE: 10/19/73

SERIAL CATEG LINE CAT-DEFINITION

DATA

SERIAL	CATEG LINE	CAT-DEFINITION	ECOLOGICAL RATING:	NAME OF AREA: STATE; COUNTY; QUADRANGLE; SIZE OF AREA:	OWNER I; OWNER II; BIOTIC COMPONENTS!	DESCRIPTION OF AREA:	ECOLOGICAL RATING:	NAME OF AREA: STATE; COUNTY; QUADRANGLE; SIZE OF AREA:	OWNER I; OWNER II; BIOTIC COMPONENTS!	DESCRIPTION OF AREA:	ECOLOGICAL RATING:	NAME OF AREA: STATE; COUNTY; QUADRANGLE; SIZE OF AREA:	OWNER I; OWNER II; BIOTIC COMPONENTS!	DESCRIPTION OF AREA:	ECOLOGICAL RATING:	NAME OF AREA: STATE; COUNTY; QUADRANGLE; SIZE OF AREA:	OWNER I; OWNER II; BIOTIC COMPONENTS!	DESCRIPTION OF AREA:	ECOLOGICAL RATING:	NAME OF AREA: STATE; COUNTY; QUADRANGLE; SIZE OF AREA:	OWNER I; OWNER II; BIOTIC COMPONENTS!	DESCRIPTION OF AREA:	ECOLOGICAL RATING:	NAME OF AREA: STATE; COUNTY; QUADRANGLE; SIZE OF AREA:	OWNER I; OWNER II; BIOTIC COMPONENTS!	DESCRIPTION OF AREA:	ECOLOGICAL RATING:	NAME OF AREA: STATE; COUNTY; QUADRANGLE; SIZE OF AREA:	OWNER I; OWNER II; BIOTIC COMPONENTS!	DESCRIPTION OF AREA:	ECOLOGICAL RATING:
00000624	010	01	08	HARNESS CREEK MARYLAND ANNE ARUNDEL SOUTH RIVER • MD 00036•4 HA PRIVATE	UPLAND MATURE FOREST IN SOUTH RIVER WATERSHED. ADJACENT LAND IS DENSE RESIDENTIAL AND 12 HA OF FARM LAND. IRREGULAR SHORELINE WITH BAYS AND INLETS. SMALL BEACH. MOSTLY WETLANDS.			GOODWIN ISLANDS VIRGINIA YORK POQUOSON WEST, VA 00169•7 HA PRIVATE	MARSH, TIDAL HIGH TIDAL MARSH VEGETATION. MANY SPECIES OF SHORE BIRDS. OSPREY. HARD SHELL CLAMS. IN YORK RIVER WATERSHED. SALT MARSH ISLAND. ABANDONED FOR PAST 40 YEARS. PREVIOUSLY SITE OF MENHADEN REDUCTION PLANT.		POHICK - ACCOTINK CREEKS, UPPER, LOWER VIRGINIA FAIRFAX ANNANDALE • VA; BELVOIR • VA 00808•0 HA PRIVATE	FEDERAL, MILITARY UPLAND MATURE HARDWOODS. UPLAND PINE FOREST, SUCCESSIONAL. ANADROMOUS FISH, HERRING. IN POTOMAC RIVER WATERSHED.		CAT POINT CREEK MARSH VIRGINIA RICHMOND TAPPAHANNOCK • VA 00686•8 HA																	
00000630	010	01	08																												
00000787	410	01	08																												
00000797	010	01	08																												
	020	01																													
	021	01																													
	030	01																													
	040	01																													
	060	01																													
	170	01																													
	180	01																													
	03	01																													
	04	01																													
	191	01																													
	200	01																													
	410	01																													
	08	01																													

CHESSAPEAKE BAY SURVEY REPORT
MASTER LIST

DATE: 10/19/73

SERIAL CATEG LINE CAT-DEFINITION

DATA

000000630	060	01	OWNER 1: AQUATIC TYPES! BIOTIC COMPONENTS!	PRIVATE MARSH, TIDAL HIGH TIDAL MARSH WITH SPARTINA CYNOSEOIDES, PANICUM VIRGATUM, HIBISCUS SP. AND TYPHA SP. OSPREY. ANADROMOUS FISH, STRIPED BASS AND HERRING. IN RAPPAHANNOCK RIVER WATERSHED.
	151	01		02
	170	01		02
	180	01	DESCRIPTION OF AREA! AREA INCL. BUFFER ZONE!	03
	400	01		400
	410	01	ECOLOGICAL RATING!	410
000000631	010	01	NAME OF AREA: STATE: COUNTY: QUADRANGLE: COORDINATES:	CRUCHE'S CREEK - TIMBER NECK CREEK VIRGINIA SURRY SURRY, VA 37 10 -- N 076 47 32 W 00149.5 HA
	020	01		020
	021	01		021
	030	01		030
	035	01	SIZE OF AREA: OWNER 1: AQUATIC TYPES! BIOTIC COMPONENTS!	035
	040	01		040
	060	01		060
	151	01		151
	170	01		170
	180	01	DESCRIPTION OF AREA! AREA INCL. BUFFER ZONE!	03
	400	01		400
	410	01	ECOLOGICAL RATING!	410
000000638	010	01	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER 1: BIOTIC COMPONENTS! ECOLOGICAL RATING!	NORTH LANDING RIVER SWAMP - POCATY CREEK SWAMP VIRGINIA CHESAPEAKE, VIRGINIA BEACH PLEASANT RIDGE, VA 04516.7 HA PRIVATE SWAMP FOREST, HARDWOODS AND TAXODIUM DISTICHUM. LARGELY SOUTHERN FLORA AND FAUNA. 07
	020	01		020
	021	01		021
	030	01		030
	040	01		040
	060	01		060
	170	01		170
	410	01		410
000000654	010	01	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER 1: AQUATIC TYPES! BIOTIC COMPONENTS! DESCRIPTION OF AREA! ECOLOGICAL RATING!	GUINEA MARSSES VIRGINIA GLOUCESTER ACHILLES, VA NEW POINT COMFORT, VA 00595.9 HA PRIVATE MARSH, TIDAL HIGH TIDAL MARSH WITH SPARTINA PATENS, JUNCUS ROEMERIANUS. OCCASIONAL ISLANDS OF PINUS TAEDA. OSPREY. SUPERB MARSSES. 07
	020	01		020
	021	01		021
	030	01		030
	040	01		040
	060	01		060
	151	01		151
	170	01		170
	180	01		180
	410	01		410
000000690	010	01	NAME OF AREA: STATE:	POINT NO POINT - REDFIN CREEK MARYLAND
	020	01		020

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

DATE: 10/19/73

SERIAL CATEG LINE

DATA

SERIAL	CATEG LINE	CAT=DEFINITION	DATA
00000690	021	COUNTY; QUADRANGLE; SIZE OF AREA; OWNER I; AQUATIC TYPES; BIOTIC COMPONENTS;	01 01 01 01 01 01
	030	DESCRIPTION OF AREA;	01
	040	ECOLOGICAL RATING;	01
00000692	010	NAME OF AREA; STATE; COUNTY; QUADRANGLE; SIZE OF AREA; OWNER I; AQUATIC TYPES; BIOTIC COMPONENTS;	01 020 021 030 040 060 151 170
	020	DESCRIPTION OF AREA;	01
	030	AREA INCL. BUFFER ZONE; ECOLOGICAL RATING;	01
00000693	010	NAME OF AREA; STATE; COUNTY; QUADRANGLE; SIZE OF AREA; OWNER I; AQUATIC TYPES; BIOTIC COMPONENTS;	01 020 021 030 040 060 151 170
	020	DESCRIPTION OF AREA; ECOLOGICAL RATING;	01
00000697	010	NAME OF AREA; STATE; COUNTY; QUADRANGLE; SIZE OF AREA; OWNER I; AQUATIC TYPES; BIOTIC COMPONENTS;	01 020 021 030 040 060 151 170
	020	DESCRIPTION OF AREA; AREA INCL. BUFFER ZONE;	01
	030	NOTE: BOG SHOULD RECEIVE SPECIAL CONSIDERATION	07
	040	HUNTING CREEK , MARYLAND CAROLINE ; DORCHESTER PRESTON . MD 00307.0 HA PRIVATE MARSH . FRESHWATER FRESHWATER MARSH WITH TYPHA SP . DUCKS IN CHOPTANK RIVER WATERSHED.	01
	050	FRAZER'S LAKE MARYLAND CECIL EARLEVILLE . MD 00064.6 HA PRIVATE POND UPLAND MATURE HARDWOODS . IN ELK RIVER WATERSHED . 00735.3 HA	01

DATE: 10/19/73

CHESSAPEAKE BAY SURVEY REPORT
MASTER LIST

SERIAL CATEG LINE CAT-DEFINITION

DATA

00000697	410	01	ECOLOGICAL RATING!	07
00000722	010	01	NAME OF AREA!	
	020	01	STATE!	HACK CREEK
	021	01	COUNTY!	VIRGINIA
	030	01	QUADRANGLE!	NORTHUMBERLAND
	040	01	SIZE OF AREA!	BURGESS, VA
	060	01	OWNER I!	00642.4 HA
	170	01	BIOTIC COMPONENTS!	PRIVATE
	02	01	DESCRIPTION OF AREA!	UPLAND MATURE HARDWOOD. UPLAND PINES, SUCCESSIONAL ANADROMOUS FISH. <i>PINUS</i> spp. + <i>QUERCUS</i> spp. IN POTOMAC RIVER WATERSHED. AGRICULTURE IS PRINCIPAL LAND USE.
	180	02		07
	410	01	ECOLOGICAL RATING!	
00000725	010	01	NAME OF AREA!	HOSKINS CREEK MARSH
	020	01	STATE!	VIRGINIA
	021	01	COUNTY!	ESSEX
	030	01	QUADRANGLE!	MOUNT LANDING, VA
	040	01	SIZE OF AREA!	00367.6 HA
	060	01	OWNER I!	PRIVATE
	151	01	AQUATIC TYPES!	MARSH, TIDAL
	170	01	BIOTIC COMPONENTS!	HIGH TIDAL MARSH. <i>SPARTINA cynosuroides</i> . ANADROMOUS FISH, STRIPED BASS AND HERRING. OSPREY. IN TAPAHANNOCK RIVER WATERSHED. PRIME WETLANDS.
	02	01	DESCRIPTION OF AREA!	01717.0 HA
	180	01	AREA INCL. BUFFER ZONE!	07
	400	01		
	410	01	ECOLOGICAL RATING!	
00000743	010	01	NAME OF AREA!	CHERRYFIELD POINT
	020	01	STATE!	MARYLAND
	021	01	COUNTY!	ST. MARY'S
	030	01	QUADRANGLE!	ST. MARY'S CITY, MD
	040	01	SIZE OF AREA!	00084.8 HA
	060	01	OWNER I!	PRIVATE
	151	01	AQUATIC TYPES!	MARSH, TIDAL
	170	01	BIOTIC COMPONENTS!	HIGH TIDAL MARSH, UPLAND MATURE HARDWOODS. OSPREY. <i>QUERCUS</i> spp. - <i>PINUS</i> spp. SALT MEADOWS. BOUNDED BY ST. MARY'S RIVER IN POTOMAC RIVER WATERSHED. AND ST. GEORGE'S CREEK. NO IMMINENT PROBLEMS. DESCRIBED AS A "UNIQUE ECOLOGICAL AREA" IN THE REPORT OF THE POTOMAC TASK FORCE. U. S. DEPT. OF INTERIOR.
	02	01	DESCRIPTION OF AREA!	
	180	02		
	03	03		
	04	04	CONTENTS IN MANUAL FILE!	GENERAL INFORMATION
	200	01	ECOLOGICAL RATING!	07
	410	01		
00000745	010	01	NAME OF AREA!	MARSH ISLAND
	020	01	STATE!	MARYLAND
	021	01	COUNTY!	CHARLES
	030	01	QUADRANGLE!	INDIAN HEAD, MD
	040	01	SIZE OF AREA!	00012. 1 HA

DATE: 10/19/73

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

SERIAL CATEG LINE CAT-DEFINITION

DATA

00000745	060	01	OWNER I: AQUATIC TYPES! BIOTIC COMPONENTS!	PRIVATE MARSH. FRESHWATER MARSH. SCIRPUS spp. MINK, OSPREY, CRAB.
	151	01		FRESHWATER MARSH. ANADROMOUS FISH.
	170	01		IN POTOMAC RIVER WATERSHED
	02		DESCRIPTION OF AREA!	07
	180	01		
	410	01	ECOLOGICAL RATING!	
00000751	010	01	NAME OF AREA!	WHITE MARSH - SKINKERS NECK
	020	01	STATE!	VIRGINIA
	021	01	COUNTY!	CAROLINE
	030	01	QUADRANGLE!	PORT ROYAL, VA
	040	01	SIZE OF AREA!	00161.6 HA
	060	01	OWNER I: BIOTIC COMPONENTS!	PRIVATE
	170	01		FRESHWATER MARSH SPECIES. SWAMP FOREST, HARDWOODS AND
	02			TAXODIUM DISTICHUM. ANADROMOUS FISH.
	180	01	DESCRIPTION OF AREA!	IN RAPPAHANNOCK RIVER WATERSHED.
	400	01	AREA INCL. BUFFER ZONE!	00210.1 HA
	410	01	ECOLOGICAL RATING!	07
00000752	010	01	NAME OF AREA!	BIG MARSH POINT
	020	01	STATE!	VIRGINIA
	021	01	COUNTY!	JAMES CITY
	030	01	QUADRANGLE!	BRANDON, VA
	040	01	SIZE OF AREA!	00080.8 HA
	060	01	OWNER I: AQUATIC TYPES! BIOTIC COMPONENTS!	PRIVATE
	151	01		FRESHWATER MARSH SPECIES. OSPREY, ANADROMOUS FISH.
	170	01		IN CHICKAHOMINY AND JAMES RIVERS WATERSHEDS. PRIME
	180	01	DESCRIPTION OF AREA!	WETLANDS.
	400	01	AREA INCL. BUFFER ZONE!	00092.9 HA
	410	01	ECOLOGICAL RATING!	07
00000758	010	01	NAME OF AREA!	KENNON MARSH
	020	01	STATE!	VIRGINIA
	021	01	COUNTY!	PRINCE GEORGE
	030	01	QUADRANGLE!	CHARLES CITY, VA
	040	01	SIZE OF AREA!	BRANDON, VA
	060	01	OWNER I: AQUATIC TYPES! BIOTIC COMPONENTS!	00266.6 HA
	151	01		PRIVATE
	170	01		FRESHWATER MARSH COMMUNITY. OSPREY, ANADROMOUS FISH.
	180	01	DESCRIPTION OF AREA!	IN JAMES RIVER WATERSHED. PRIME WETLANDS.
	400	01	AREA INCL. BUFFER ZONE!	00303.0 HA
	410	01	ECOLOGICAL RATING!	07
00000767	010	01	NAME OF AREA!	TANGIER ISLAND
	020	01	STATE!	VIRGINIA
	021	01	COUNTY!	ACCOMACK
	030	01	QUADRANGLE!	TANGIER ISLAND, VA

**CHESAPEAKE BAY SURVEY REPORT
MASTER LIST**

DATE: 10/19/73

SERIAL CATEG LINE CAT-DEFINITION

DATA

00000767 040 01 SIZE OF AREA;
060 01 OWNER I;
151 01 AQUATIC TYPES;
170 01 BIOTIC COMPONENTS;

	ECOLOGICAL RATING!
01	NAME OF AREA!
01	STATE!
01	COUNTY!
01	QUADRANGLE!
01	SIZE OF AREA!
01	OWNER !;
01	AQUATIC TYPES!
01	BIOTIC COMPONENTS!
01	DESCRIPTION OF ARE
010	010 01
020	020 01
021	021 01
030	030 01
040	040 01
060	060 01
151	151 01
170	170 01
180	180 01

0000075

AREA INCL. BUFFER ZONE:
ECOLOGICAL RATING:

00000782

00270.7 HA
PRIVATE
MARSH. TIDAL
HIGH TIDAL MARSH.
PLANT SPECIES INCLUDE SPARTINA
PATENS, DISTICHlis SP. AND JUNCUS ROEMERIANUS.
OYSTERS, CRABS, OSPREY.
07

BREWER POND
MARYLAND
ANNE ARUNDEL
ROUND BAY, MD
00408.0 HA
PRIVATE
POND
UPLAND MATURE HARDWOODS. OVERWINTERING SWAN.
LOCATED ON SOUTH BANK OF SEVEN RIVER JUST UPSTREAM
FROM SHERWOOD FOREST RESIDENTIAL DEVELOPMENT.
SHORELINE OF POND, IRREGULAR, SMALL WETLAND AREAS.
NARROW BEACH.
00137.4 HA

POPE'S CREEK
MARYLAND
CHARLES
POPE'S CREEK, MD
00097.0 HA
PRIVATE
MARSH, TIDAL
HIGH TIDAL MARSH.
MUSKRAT AND CRABS.
ABANDONED RAILROAD.
ACCESS. IN POTOMAC RIVER WATERSHED.
POPE'S CREEK GEOLOGIC SECTION.
SPARTINA CYNOSUROIDES, OTTER,
ANADROMOUS FISH, STRIPED BASS,
ALONG NORTHERN EDGE MAKES GOOD
LOCATED NEAR
OSPREY,
00533.3 HA
07

	NAME OF AREA!	STATE!	COUNTY!	QUADRANGLE!	SIZE OF AREA!	OWNER !	AQUATIC TYPES!	BIOTIC COMPONENTS!								
000000786	010	01	020	01	021	01	030	01	040	01	060	01	151	01	170	01

DISTICHIS SP. AND JUNCUS ROEMERIANUS. OSPREY, MINK -
OTTER, CANVASBACK DUCKS AND CRABS.

DATE: 10/19/73

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

SERIAL CATEG LINE CAT-DEFINITION

DATA

SERIAL	CATEG	LINE	CAT-DEFINITION	DATA
000000788	180	01	DESCRIPTION OF AREA! AREA INCL. BUFFER ZONE!	IN PATUXENT RIVER WATERSHED. 00137.4 HA 07
	400	01	ECOLOGICAL RATING!	
	410	01		
000000790	010	01	NAME OF AREA! STATE!	LONG COVE CALVERT
	021	01	COUNTY!	BROOMES ISLAND, MD
	030	01	QUADRANGLE!	00088.9 HA
	040	01	SIZE OF AREA!	PRIVATE
	060	01	OWNER I!	HIGH TIDAL MARSH. PLANT SPECIES INCLUDE SPARTINA PATENS, DISTICHLIS SP. AND JUNCUS ROEMERIANUS. OTTER, OSPREY
	170	01	BIOTIC COMPONENTS!	AND CRABS.
	02	01		
	03	01	DESCRIPTION OF AREA! AREA INCL. BUFFER ZONE!	IN PATUXENT RIVER WATERSHED. 00456.5 HA 07
	400	01	ECOLOGICAL RATING!	
	410	01		
000000792	010	01	NAME OF AREA!	POND CREEK
	020	01	STATE!	MARYLAND
	021	01	COUNTY!	CECIL
	030	01	QUADRANGLE!	EARLEVILLE, MD
	040	01	SIZE OF AREA!	00379.8 HA
	060	01	OWNER II!	PRIVATE
	151	01	AQUATIC TYPES!	MARSH, FRESHWATER
	170	01	BIOTIC COMPONENTS!	FRESHWATER MARSH WITH SCIRPUS SPP. OTTER, CLAMS AND OVERWINTERING GEESE. ANADROMOUS FISH.
	02	01		IN ELK RIVER WATERSHED.
	180	01	DESCRIPTION OF AREA! AREA INCL. BUFFER ZONE!	00820.1 HA
	400	01	ECOLOGICAL RATING!	07
	410	01		
000000793	010	01	NAME OF AREA!	PISCATAWAY CREEK
	020	01	STATE!	MARYLAND
	021	01	COUNTY!	PRINCE GEORGES
	030	01	QUADRANGLE!	PISCATAWAY, MD
	040	01	SIZE OF AREA!	MT. VERNON, VA 00646.4 HA
	060	01	OWNER I!	PRIVATE
	151	01	AQUATIC TYPES!	MARSH, FRESHWATER
	170	01	BIOTIC COMPONENTS!	FRESHWATER MARSH WITH TYPHA SP. MINK, OTTER AND WOOD DUCK. ANADROMOUS FISH. HERRING.
	02	01		IN POTOMAC RIVER WATERSHED.
	180	01	DESCRIPTION OF AREA! ECOLOGICAL RATING!	07
	410	01		
000000826	010	01	NAME OF AREA!	MUDGY CREEK
	020	01	STATE!	MARYLAND
	021	01	COUNTY!	ANNE ARUNDEL
	030	01	QUADRANGLE!	SOUTH RIVER, MD
	040	01	SIZE OF AREA!	DEALE, MD 00222.2 HA
	060	01	OWNER I!	SMITHSONIAN INSTITUTION
	065	01	OWNER II!	PRIVATE

DATE: 10/19/73

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

SERIAL CATEG LINE CAT-DEFINITION

DATA

000000826 151 01 AQUATIC TYPES;
BIOTIC COMPONENTS;
170 01
02
410 01 ECOLOGICAL RATING;

000000832 010 01 NAME OF AREA;
STATE;
020 01 COUNTY;
021 01 QUADRANGLE;
030 01 SIZE OF AREA;
040 01 OWNER I;
060 01 OWNER II;
065 01 OWNER III;
151 01 AQUATIC TYPES;
170 01 BIOTIC COMPONENTS;
RARE AND ENDANGERED PLANTS;
190 01
410 01 ECOLOGICAL RATING;

000000611 010 01 NAME OF AREA;
STATE;
020 01 COUNTY;
021 01 QUADRANGLE;
030 01 SIZE OF AREA;
040 01 OWNER I;
060 01 OWNER II;
065 01 OWNER III;
151 01 AQUATIC TYPES;
170 01 BIOTIC COMPONENTS;
02
180 01 DESCRIPTION OF AREA;
AREA INCL. BUFFER ZONE;
400 01
410 01 ECOLOGICAL RATING;

000000623 010 01 NAME OF AREA;
STATE;
020 01 COUNTY;
021 01 QUADRANGLE;
030 01 SIZE OF AREA;
040 01 OWNER I;
060 01 OWNER II;
151 01 AQUATIC TYPES;
170 01 BIOTIC COMPONENTS;
02
180 01 DESCRIPTION OF AREA;
02
03
200 01 CONTENTS IN MANUAL FILE;
AREA INCL. BUFFER ZONE;
400 01 ECOLOGICAL RATING;
410 01
000000628 010 01 NAME OF AREA;

MARSH. TIDAL
HIGH TIDAL MARSH. ANADROMOUS FISH, OTTER, MINK, ALEWIVES,
CRAB, CLAMS, OYSTER.
07

CHIPPOKE CREEK MARSH, LOWER
VIRGINIA
SURRY
HOG ISLAND, VA; BACONS CASTLE, VA
00242.4 HA
STATE OF VIRGINIA PARKS COMMISSION
PRIVATE
MARSH. TIDAL
HIGH TIDAL MARSH. ANADROMOUS FISH.
EUPATORIUM SALTUENSE
07

COLLEGE GREEK MARSH
VIRGINIA
JAMES CITY
HOG ISLAND, VA; WILLIAMSBURG, VA
00521.2 HA
PRIVATE
FEDERAL AGENCY
MARSH. TIDAL
HIGH TIDAL MARSH VEGETATION. HERONRY.
ANADROMOUS FISH. HERRING RUN.
IN JAMES RIVER WATERSHED. HEAVY DISTURBANCE.
02109.9 HA
06

NEABSCO CREEK MARSH
VIRGINIA
PRINCE WILLIAM
QUANTICO, VA; INDIAN HEAD, VA
00339.4 HA
PRIVATE
MARB. FRESHWATER
ANADROMOUS FISH. DOMINANT PLANT SPECIES ARE ZIZANIA
SP. • TYPHA SP. • PONTEDERIA SP. AND POLYGONUM SP.
IN POTOMAC RIVER WATERSHED. THE DISTRICT OF COLUMBIA
WISHES TO FILL AREA WITH REFUSE AND BUILD A SEWAGE
PLANT AND MARINA.
LOCATION MAP
01171.6 HA
06

QUANTICO CREEK

DATE: 10/19/73

CHESSAPEAKE BAY SURVEY REPORT
MASTER LIST

SERIAL CATEG LINE CAT-DEFINITION

DATA

SERIAL	CATEG LINE	CAT-DEFINITION	DATA
000000628	020	01 STATE:	VIRGINIA
	021	01 COUNTY:	PRINCE WILLIAM
	040	01 SIZE OF AREA:	00464.6 HA
	060	01 OWNER I:	PRIVATE
	151	01 AQUATIC TYPES:	FRESHWATER
	170	01 BIOTIC COMPONENTS:	FRESHWATER MARSH VEGETATION. HERRING.
	02 DESCRIPTION OF AREA:	IN POTOMAC RIVER WATERSHED.	
	180	01 AREA INCL. BUFFER ZONE:	01373.6 HA
	400	01 ECOLOGICAL RATING:	06
000000647	010	01 NAME OF AREA:	HYSLOP MARSH
	020	01 STATE:	VIRGINIA
	021	01 COUNTY:	ACCOMACK
	030	01 QUADRANGLE:	JAMESVILLE, VA
	040	01 SIZE OF AREA:	00416.1 HA
	060	01 OWNER I:	PRIVATE
	151	01 AQUATIC TYPES:	MARSH. TIDAL
	170	01 BIOTIC COMPONENTS:	HIGH TIDAL MARSH VEGETATION. OSPREY.
	180	01 DESCRIPTION OF AREA:	PRIME WETLAND.
	410	01 ECOLOGICAL RATING:	06
000000650	010	01 NAME OF AREA:	WINTER HARBOR MARSH - GARDEN CREEK MARSH
	020	01 STATE:	VIRGINIA
	021	01 COUNTY:	MATHEWS
	030	01 QUADRANGLE:	NEW POINT COMFORT, VA
	040	01 SIZE OF AREA:	00545.4 HA
	060	01 OWNER I:	PRIVATE
	151	01 AQUATIC TYPES:	MARSH. TIDAL
	170	01 BIOTIC COMPONENTS:	HIGH TIDAL MARSH VEGETATION. OSPREY.
	400	01 AREA INCL. BUFFER ZONE:	00597.9 HA
	410	01 ECOLOGICAL RATING:	06
000000651	010	01 NAME OF AREA:	COHOKE MARSH
	020	01 STATE:	VIRGINIA
	021	01 COUNTY:	KING WILLIAM
	030	01 QUADRANGLE:	NEW KENT, VA
	040	01 SIZE OF AREA:	00331.3 HA
	060	01 OWNER I:	PRIVATE
	170	01 BIOTIC COMPONENTS:	SWAMP FOREST, HARDWOODS.
	180	01 DESCRIPTION OF AREA:	ANADROMOUS FISH.
	400	01 AREA INCL. BUFFER ZONE:	PRIME WETLAND.
	410	01 ECOLOGICAL RATING:	00420.2 HA
	06		06
000000664	010	01 NAME OF AREA:	RED POINT
	020	01 STATE:	MARYLAND
	021	01 COUNTY:	CECIL
	030	01 QUADRANGLE:	NORTH EAST, MD

DATE: 10/19/73

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

SERIAL CATEG LINE CAT=DEFINITION

DATA

SERIAL	CATEG LINE	CAT=DEFINITION	DATA
00000664	040	01 SIZE OF AREA;	00109.1 HA
	060	01 OWNER I;	PRIVATE - BOY SCOUTS
	170	01 BIOTIC COMPONENTS:	SWAMP FOREST, HARDWOODS, ANADROMOUS FISH, HERRING,
	02	01 AREA INCL. BUFFER ZONE:	SHAD, STRIPED BASS.
	400	01 ECOLOGICAL RATING:	CRABS.
	410		00428.2 HA
			06
00000671	010	01 NAME OF AREA;	ELK RIVER
	020	01 STATE;	MARYLAND
	021	01 COUNTY;	CECIL
	030	01 QUADRANGLE;	ELKTON, MD
	040	01 SIZE OF AREA;	00460.6 HA
	060	01 OWNER I;	PRIVATE
	151	01 AQUATIC TYPES;	MARSH, FRESHWATER
	170	01 BIOTIC COMPONENTS:	FRESHWATER MARSH WITH SCIRPUS SPP. AND TYPHA SP.
	02		ANADROMOUS FISH, SHAD.
	180	01 DESCRIPTION OF AREA;	CRABS.
	400	01 AREA INCL. BUFFER ZONE:	IN ELK RIVER WATERSHED
	410	01 ECOLOGICAL RATING:	00832.2 HA
			06
00000676	010	01 NAME OF AREA;	HARBOR COVE-LOWES POINT
	020	01 STATE;	MARYLAND
	021	01 COUNTY;	TALBOT
	030	01 QUADRANGLE;	NORTH BEACH, MD
	040	01 SIZE OF AREA;	00068.7 HA
	060	01 OWNER I;	PRIVATE
	151	01 AQUATIC TYPES;	MARSH, TIDAL
	170	01 BIOTIC COMPONENTS:	HIGH TIDAL MARSH.
	02		OSPREY, ANADROMOUS FISH, STRIPPED
	410	01 ECOLOGICAL RATING:	BASS
			06
00000696	010	01 NAME OF AREA;	CYPRESS BRANCH
	020	01 STATE;	MARYLAND
	021	01 COUNTY;	KENT
	030	01 QUADRANGLE;	MILLINGTON, MD
	040	01 SIZE OF AREA;	00328.5 HA
	060	01 OWNER I;	PRIVATE
	151	01 AQUATIC TYPES;	SWAMP FOREST, TAXODIUM DISTICHUM, CHAMAECYPARIS
	170	01 BIOTIC COMPONENTS:	THYOIDES, WOOD DUCK.
	02		IN CHESTER RIVER WATERSHED
	180	01 DESCRIPTION OF AREA;	01644.3 HA
	400	01 AREA INCL. BUFFER ZONE:	06
	410	01 ECOLOGICAL RATING:	
00000698	010	01 NAME OF AREA;	MEDLEY CREEK
	020	01 STATE;	MARYLAND
	030	01 QUADRANGLE;	ST. CLEMENTS, MD
	040	01 SIZE OF AREA;	00052.5 HA

DATE: 10/19/73

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

SERIAL CATEG LINE CAT-DEFINITION

DATA

00000698	060	01	OWNER 1! AQUATIC TYPES; BIOTIC COMPONENTS!	PRIVATE FRESHWATER MARSH. FRESHWATER MARSH WITH SCIRPUS SPP. AND TYPHA SP. OYSTER, CLAM, CRAB, OSPREY. IN POTOMAC RIVER WATERSHED. 06
00000704	010	01	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER 1! AQUATIC TYPES; BIOTIC COMPONENTS!	WARWICK RIVER VIRGINIA NEWPORT NEWS MULBERRY ISLAND, VA! 00686.8 HA PRIVATE MARSH, TIDAL HIGH TIDAL MARSH. PLANT SPECIES INCLUDE SPARTINA ALTERNIFLORA AND SPARTINA CYNOSUROIDES. OYSTERS. JAMES RIVER WATERSHED. AREA BEING ENCROACHED BY DEVELOPMENTS. 06
00000705	010	01	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER 1! AQUATIC TYPES; BIOTIC COMPONENTS!	BROOKS CREEK MARSH VIRGINIA KING WILLIAM KING AND QUEEN COURTHOUSE, VA 00404.0 HA PRIVATE MARSH, FRESHWATER SWAMP FOREST. ANADROMOUS FISH, HERRING AND STRIPED BASS. IN YORK RIVER WATERSHED. PRIME WETLANDS. 02383.6 HA 06
00000709	010	01	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER 1! AQUATIC TYPES; BIOTIC COMPONENTS!	AQUIA CREEK VIRGINIA STAFFORD STAFFORD, VA! 00355.5 HA PRIVATE MARSH, FRESHWATER ANADROMOUS FISH, HERRING. NELUMBO SP. (LOTUS LILY) MARSH. IN POTOMAC RIVER WATERSHED. UPPER END OF AQUIA CREEK. EXCELLENT MARSH AND WETLANDS AREA. NOW BEING DEVELOPED. 02007.9 HA 06
00000718	010	01	NAME OF AREA:	CHARLES NECK SWAMP

DATE: 10/19/73

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

SERIAL CATEG LINE CAT-DEFINITION

DATA

SERIAL	CATEG	LINE	CAT-DEFINITION	DATA
000000718	020	01	STATE!	VIRGINIA
	021	01	COUNTY!	HENRICO
	030	01	QUADRANGLE!	HOPEWELL, VA
	040	01	SIZE OF AREA!	00580.0 HA
	060	01	OWNER 1!	PRIVATE
	170	01	BIOTIC COMPONENTS!	SWAMP FOREST, HARDWOODS AND TAXODIUM DISTICHUM. IN JAMES RIVER WATERSHED. NEAR MEADOWVIEW REGIONAL PARK GRAVEL DREDGING OPERATIONS IN AREA. PRIME WETLANDS.
	180	01	DESCRIPTION OF AREA!	
	02			
	03	01	AREA INCL. BUFFER ZONE!	
	400	01	ECOLOGICAL RATING!	
	410	01		06
000000723	010	01	NAME OF AREA!	HALL TRACT
	020	01	STATE!	VIRGINIA
	021	01	COUNTY!	NORTHUMBERLAND
	030	01	QUADRANGLE!	FLEETS BAY, VA
	035	01	COORDINATES!	37 41 -- N 076 18 30 W
	040	01	SIZE OF AREA!	00262.6 HA
	060	01	OWNER 1!	PRIVATE
	151	01	AQUATIC TYPES!	MARSH, TIDAL I POND
	170	01	BIOTIC COMPONENTS!	HIGH TIDAL MARSH. PLANT SPECIES INCLUDE SPARTINA PATENS, DISTICHLIS SP. AND JUNCUS ROEMERIANUS. OYSTER BEDS.
	02			GREAT BLUE HERONS. EGRETS.
	03	01	DESCRIPTION OF AREA!	INCLUDES SOME FARMLAND AND TIMBER LAND. AREA IS RELATIVELY INACCESSIBLE.
	180	01		06
	02			
	01	01	ECOLOGICAL RATING!	
000000731	010	01	NAME OF AREA!	SCOTCHMAN CREEK
	020	01	STATE!	MARYLAND
	021	01	COUNTY!	CECIL
	030	01	QUADRANGLE!	EARLEVILLE, MD
	040	01	SIZE OF AREA!	00187.8 HA
	060	01	OWNER 1!	PRIVATE
	151	01	AQUATIC TYPES!	FRESHWATER MARSH WITH SCIRPUS SPP.
	170	01	BIOTIC COMPONENTS!	OTTER, SWAN, ANADROMOUS FISH.
	02			IN ELK RIVER WATERSHED. PRIME WETLANDS.
	180	01	DESCRIPTION OF AREA!	
	400	01	AREA INCL. BUFFER ZONE!	00597.9 HA
	410	01	ECOLOGICAL RATING!	06
000000734	010	01	NAME OF AREA!	THORN GUT MARSH
	020	01	STATE!	MARYLAND
	021	01	COUNTY!	CHARLES
	030	01	QUADRANGLE!	WIDEWATER, MD
	040	01	SIZE OF AREA!	NANJEMOY, MD
	060	01	OWNER 1!	00072.7 HA
	151	01	AQUATIC TYPES!	PRIVATE
	170	01	BIOTIC COMPONENTS!	FRESHWATER MARSH WITH SCIRPUS SPP.
				MINK, OTTER, OYSTER, 100

DATE: 10/19/73

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

SERIAL CATEG LINE CAT-DEFINITION

DATA

00000734 170 02 DESCRIPTION OF AREA:
180 01 ECOLOGICAL RATING:
410 01 NAME OF AREA:
010 01 STATE:
020 01 COUNTY:
021 01 QUADRANGLE:
030 01 SIZE OF AREA:
040 01 AQUATIC TYPES:
060 01 OWNER I:
151 01 BIOTIC COMPONENTS:
170 01 DESCRIPTION OF AREA:
180 01 ECOLOGICAL RATING:
410 01 NAME OF AREA:
010 01 STATE:
020 01 COUNTY:
021 01 QUADRANGLE:
030 01 SIZE OF AREA:
040 01 AQUATIC TYPES:
154 01 BIOTIC COMPONENTS:
170 01 DESCRIPTION OF AREA:
180 01 ECOLOGICAL RATING:
410 01 NAME OF AREA:
010 01 STATE:
020 01 COUNTY:
021 01 QUADRANGLE:
030 01 SIZE OF AREA:
040 01 AQUATIC TYPES:
060 01 OWNER I:
151 01 BIOTIC COMPONENTS:
170 01 DESCRIPTION OF AREA:
180 01 AREA INCL. BUFFER ZONE:
400 01 ECOLOGICAL RATING:
410 01 NAME OF AREA:
010 01 STATE:
020 01 COUNTY:
030 01 QUADRANGLE:
040 01 SIZE OF AREA:
060 01 OWNER I:
151 01 AQUATIC TYPES:

CRAB.
IN POTOMAC RIVER WATERSHED
06
ANDOVER BRANCH
MARYLAND
QUEEN ANNE
SUDLERSVILLE, MD
00141.4 HA
PRIVATE
SWAMP FOREST. HARDWOODS. CHAMAECYPARIS THYOIDES.
WOOD DUCK.
IN CHESTER RIVER WATERSHED
06 NOTE: AREA SHOULD RECEIVE SPECIAL CONSIDERATION
BERRY RUN - BELL CREEK
MARYLAND
CAROLINE
FOWLING CREEK, MD
00121.2 HA
MARSH. FRESHWATER
FRESHWATER MARSH WITH *TYPHA* SP. AND *SCIRPUS* spp.
OTTER. ANADROMOUS FISH. STRIPED BASS, WHITE SHAD,
HICKORY SHAD, HERRING.
IN CHOPTANK RIVER WATERSHED. PRIME WETLAND.
06
DAMERON MARSH
VIRGINIA
NORTHUMBERLAND
REEDVILLE, VA
00088.9 HA
PRIVATE
MARSH. TIDAL
HIGH TIDAL MARSH. PLANT SPECIES INCLUDE *SPARTINA*
PATENS, *DISTICHlis* SP. AND *JUNCUS ROEMERIANUS*.
PRIME WETLANDS.
00097.0 HA
06
PAYNES ISLAND MARSHES
VIRGINIA
ESSEX
CHAMPLAIN, VA
00670.8 HA
PRIVATE
MARSH. TIDAL

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

DATE: 10/19/73

SERIAL CATEG LINE CAT-DEFINITION

DATA

SERIAL	CATEG LINE	CAT-DEFINITION	DATA
00000762	170	BIOTIC COMPONENTS:	HIGH TIDAL MARSH. PLANT SPECIES INCLUDE SPARTINA PATENS, DISTICHLIS SP. AND JUNCUS ROEMERIANUS.
	02		ANADROMOUS FISH.
	03	DESCRIPTION OF AREA:	IN RAPPAHANNOCK RIVER WATERSHED. PRIME WETLAND.
	180	AREA INCL. BUFFER ZONE:	00795.9 HA
	400		06
	410	ECOLOGICAL RATING:	
00000763	010	NAME OF AREA:	RIGBY ISLAND
	020	STATE:	VIRGINIA
	021	COUNTY:	MATHEWS
	030	QUADRANGLE:	MATHEWS, VA
	040	SIZE OF AREA:	00048.5 HA
	060	OWNER 1:	PRIVATE
	151	AQUATIC TYPES:	MARSH, TIDAL
	170	BIOTIC COMPONENTS:	HIGH TIDAL MARSH. PLANT SPECIES INCLUDE SPARTINA PATENS, DISTICHLIS SP. AND JUNCUS ROEMERIANUS.
	02	DESCRIPTION OF AREA:	OSPREY, SANDY BEACH,
	180		06
	410	ECOLOGICAL RATING:	
00000769	010	NAME OF AREA:	LYONS CREEK
	020	STATE:	MARYLAND
	021	COUNTY:	ANNE ARUNDEL
	030	QUADRANGLE:	DEAL, MD
	040	SIZE OF AREA:	00307.0 HA
	060	OWNER 1:	PRIVATE
	170	BIOTIC COMPONENTS:	SWAMP FOREST, HARDWOODS. NESTING WOOD DUCKS, MINK.
	02	DESCRIPTION OF AREA:	HAWKS.
	180	AREA INCL. BUFFER ZONE:	IN PATUXENT RIVER WATERSHED.
	400		06
	410	ECOLOGICAL RATING:	
00000805	010	NAME OF AREA:	NEWTON NECK
	020	STATE:	MARYLAND
	021	COUNTY:	ST. MARY'S
	030	QUADRANGLE:	ST. CLEMENTS ISLAND, MD
	040	SIZE OF AREA:	LEONARDTOWN, MD
	170	BIOTIC COMPONENTS:	00331.3 HA
	180	DESCRIPTION OF AREA:	UPLAND MATURE FOREST. OSPREY.
	02		IN POTOMAC RIVER WATERSHED. SIGNIFICANT FOR ITS HISTORICAL, NATURAL AND RECREATIONAL VALUES. 80.8 HA PLANNED FOR A GOLF COURSE.
	03		REST OF AREA WILL PROBABLY BE DEVELOPED RESIDENTIALLY.
	410	ECOLOGICAL RATING:	06
00000812	010	NAME OF AREA:	HEMLOCK STAND ON MILL CREEK
	020	STATE:	MARYLAND
	021	COUNTY:	CAROLINE
	030	QUADRANGLE:	HOBBS, MD
	040	SIZE OF AREA:	00016.2 HA
	060	OWNER 1:	PRIVATE

CHESSAPEAKE BAY SURVEY REPORT
MASTER LIST

DATE: 10/19/73

SERIAL CATEG LINE CAT-DEFINITION

DATA

SERIAL	CATEG LINE	CAT-DEFINITION	DATA
000000812	151 170	AQUATIC TYPES! BIOTIC COMPONENTS!	SWAMP FOREST HARDWOODS. TSUGA CANADENSIS. 02 OCCURRING OUTSIDE ITS COASTAL PLAIN RANGE. IN CHOPTANK RIVER WATERSHED
	180 410	DESCRIPTION OF AREA! ECOLOGICAL RATING!	01 01 06 NOTE: AREA SHOULD RECEIVE SPECIAL CONSIDERATION
000000824	010 020	NAME OF AREA! STATE!	PEARCE CREEK MARYLAND
	021 030 040 060 151 170 410	COUNTY! QUADRANGLE! SIZE OF AREA! OWNER 1! AQUATIC TYPES! BIOTIC COMPONENTS! ECOLOGICAL RATING!	CECIL EARLEVILLE. MD 01770.5 HA CORP OF ENGINEERS MARSH, FRESHWATER FRESHWATER MARSH WITH SCIRPUS spp. GESE. ANADROMOUS FISH. 06
000000604	010 020	NAME OF AREA! STATE!	MULBERRY ISLAND VIRGINIA
	021 030 040 060 151 170 410	COUNTY! QUADRANGLE! SIZE OF AREA! OWNER 1! AQUATIC TYPES! BIOTIC COMPONENTS! ECOLOGICAL RATING!	NEWPORT NEWS CITY MULBERRY ISLAND. VA 00404.0 HA FEDERAL MARSH, TIDAL HIGH TIDAL MARSH. UPLAND PINE, SUCCESSIONAL. OYSTERS. 05
000000642	010 020	NAME OF AREA! STATE!	BYRDS MARSH - PARKSLEY MARSHES VIRGINIA
	021 030 040 060 151 170 410	COUNTY! QUADRANGLE! SIZE OF AREA! OWNER 1! AQUATIC TYPES! BIOTIC COMPONENTS! ECOLOGICAL RATING!	ACCOMACK PARKSLEY. VA 05615.6 HA PRIVATE MARSH, TIDAL HIGH TIDAL MARSH VEGETATION. 05
000000646	010 020	NAME OF AREA! STATE!	SWEET HALL MARSH VIRGINIA
	021 030 040 060 151 170 410	COUNTY! QUADRANGLE! SIZE OF AREA! OWNER 1! AQUATIC TYPES! BIOTIC COMPONENTS! ECOLOGICAL RATING!	KING WILLIAM NEW KENT. VA 00444.4 HA PRIVATE MARSH, TIDAL HIGH TIDAL MARSH VEGETATION. OTTER. ANADROMOUS FISH. IN PAMUNKEY AND YORK RIVERS WATERSHEDS. 00537.3 HA 05
000000649	010	NAME OF AREA!	PAGAN RIVER MARSH

DATE: 10/19/73

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

SERIAL CATEG LINE CAT-DEFINITION

DATA

00000649 020 01 STATE!
 021 01 COUNTY!
 030 01 QUADRANGLE!
 040 01 SIZE OF AREA!
 060 01 OWNER !;
 151 01 AQUATIC TYPES!
 170 01 BIOTIC COMPONENTS!
 180 01 DESCRIPTION OF AREA!
 400 01 AREA INCL. BUFFER ZONE!
 410 01 ECOLOGICAL RATING;

VIRGINIA
 ISLE OF WIGHT
 MULBERRY ISLAND, VA; BENNS CHURCH, VA
 00315.1 HA
 PRIVATE
 MARSH. TIDAL
 HIGH TIDAL MARSH WITH SPARTINA ALTERNIFLORA, SPARTINA
 CYNOSUROIDES, IVA SP. AND BACCHARIS SP.
 IN JAMES RIVER WATERSHED
 00614.1 HA
 05

00000655 010 01 NAME OF AREA!
 020 01 STATE!
 021 01 COUNTY!
 030 01 QUADRANGLE!
 040 01 SIZE OF AREA!
 060 01 OWNER !;
 151 01 AQUATIC TYPES!
 179 01 BIOTIC COMPONENTS!
 180 01 DESCRIPTION OF AREA!
 400 01 AREA INCL. BUFFER ZONE!
 410 01 ECOLOGICAL RATING;

LAWNES CREEK MARSH
 VIRGINIA
 ISLE OF WIGHT! SURRY
 BACONS CASTLE, VA; HOG ISLAND, VA
 00438.3 HA
 PRIVATE
 MARSH. TIDAL
 HIGH TIDAL MARSH VEGETATION.
 IN JAMES RIVER WATERSHED. PRIME WETLAND.
 01706.9 HA
 05

00000694 010 01 NAME OF AREA!
 020 01 STATE!
 021 01 COUNTY!
 030 01 QUADRANGLE!
 040 01 SIZE OF AREA!
 060 01 OWNER !;
 151 01 AQUATIC TYPES!
 170 01 BIOTIC COMPONENTS!
 180 01 DESCRIPTION OF AREA!
 02
 03
 400 01 AREA INCL. BUFFER ZONE!
 410 01 ECOLOGICAL RATING;

PARKER CREEK
 MARYLAND
 CALVERT
 PRINCE FREDERICK, MD
 00218.2 HA
 PRIVATE
 MARSH. FRESHWATER! STREAM
 FRESHWATER MARSH WITH TYPHA SP. OTTER,
 SPARSELY DEVELOPED AREA. TOBACCO FIELDS INTERMINGLED
 IN THE WOODLAND. TOPOGRAPHY IS SHARPLY ROLLING.
 HIGH BANKS ALONG CREEK
 01636.2 HA
 05

00000712 010 01 NAME OF AREA!
 020 01 STATE!
 021 01 COUNTY!
 030 01 QUADRANGLE!
 040 01 SIZE OF AREA!
 060 01 OWNER !;
 151 01 AQUATIC TYPES!
 170 01 BIOTIC COMPONENTS!
 02
 03
 400 01 AREA INCL. BUFFER ZONE!
 410 01 ECOLOGICAL RATING;

UPPER MACHODOC CREEK
 VIRGINIA
 KING GOERGE
 DAHLGREN, VA
 00278.8 HA
 PRIVATE
 MARSH. TIDAL
 HIGH TIDAL MARSH.
 FISH. OYSTERS.
 01805.9 HA

104

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

DATE: 10/19/73

SERIAL CATEG LINE CAT-DEFINITION

DATA

SERIAL	CATEG	LINE	CAT-DEFINITION	ECOLOGICAL RATING:	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I: AQUATIC TYPES: BIOTIC COMPONENTS:	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I: AQUATIC TYPES: BIOTIC COMPONENTS:	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I: AQUATIC TYPES: BIOTIC COMPONENTS:	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I: AQUATIC TYPES: BIOTIC COMPONENTS:	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I: AQUATIC TYPES: BIOTIC COMPONENTS:	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I: AQUATIC TYPES: BIOTIC COMPONENTS:		
000000712	410	01	ECOLOGICAL RATING:	05								
000000716	010	01	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I: AQUATIC TYPES: BIOTIC COMPONENTS:		BLACKWALNUT RIDGE - COW ISLAND VIRGINIA YORK POQUOSON EAST, VA HAMPTON, VA 00686.8 HA PRIVATE MARSH, TIDAL HIGH TIDAL MARSH. PLANT SPECIES INCLUDE SPARTINA PATENS, DISTICHLIS SP. AND JUNCUS ROEMERIANUS. HARD SHELL CLAMS.							
	020	01										
	021	01										
	030	01										
	040	01										
	060	01										
	151	01										
	170	01										
	02											
	03											
	410	01	ECOLOGICAL RATING:	05								
000000721	010	01	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I: AQUATIC TYPES: BIOTIC COMPONENTS:		GLEASON MARSH VIRGINIA KING AND QUEEN KING AND QUEEN COURTHOUSE, VA TRUHART, VA 00400.0 HA PRIVATE MARSH, FRESHWATER FRESHWATER MARSH SPECIES. SWAMP FOREST. ANADROMOUS FISH. 00953.4 HA							
	020	01										
	021	01										
	030	01										
	040	01										
	060	01										
	151	01										
	170	01										
	02											
	000		AREA INCL. BUFFER ZONE:									
	410	01	ECOLOGICAL RATING:	05								
000000727	010	01	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I: AQUATIC TYPES: BIOTIC COMPONENTS:		MOSQUITO ISLAND VIRGINIA LANCASTER DELTAVILLE, VA 00040.4 HA PRIVATE MARSH, TIDAL HIGH TIDAL MARSH. PLANT SPECIES INCLUDE SPARTINA PATENS, DISTICHLIS SP. AND JUNCUS ROEMERIANUS. OYSTERS. FIVE OSPREY NESTS.							
	020	01										
	021	01										
	030	01										
	040	01										
	060	01										
	151	01										
	170	01										
	02											
	03											
	410	01	ECOLOGICAL RATING:	05								
000000729	010	01	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I: AQUATIC TYPES: BIOTIC COMPONENTS:		POWELL CREEK VIRGINIA PRINCE GEORGE WESTOVER, VA 00383.8 HA PRIVATE MARSH, FRESHWATER FRESHWATER MARSH SPECIES. ANADROMOUS FISH, STRIPED BASS AND HERRING. PRIME WETLANDS.							
	020	01										
	021	01										
	030	01										
	040	01										
	060	01										
	151	01										
	170	01										
	02											
	01		DESCRIPTION OF AREA:	180								

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

DATE: 10/19/73

DATA

SERIAL	CATEG LINE	CAT-DEFINITION	AREA INCL. BUFFER ZONE: ECOLOGICAL RATING:	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I: AQUATIC TYPES! BIOTIC COMPONENTS:	AREA INCL. BUFFER ZONE: ECOLOGICAL RATING:	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I: BIOTIC COMPONENTS: DESCRIPTION OF AREA: ECOLOGICAL RATING:	AREA INCL. BUFFER ZONE: ECOLOGICAL RATING:	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I: BIOTIC COMPONENTS: DESCRIPTION OF AREA: ECOLOGICAL RATING:	AREA INCL. BUFFER ZONE: ECOLOGICAL RATING:	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I:
00000729	400 410	01 01	01575.6 HA 05	RAGGED ISLAND - BALLARD MARSH VIRGINIA ISLE OF WIGHT BENNS CHURCH, VA 00973.0 HA PRIVATE OWNER I: MARB, TIDAL HIGH TIDAL MARSH. PLANT SPECIES INCLUDE SPARTINA PATENS, DISTICHlis SP. AND JUNCUS ROEMERIANUS. OYSTERS.	01575.6 HA 05	MAYO POINT MARYLAND ANNE ARUNDEL SOUTH RIVER, MD 00040.4 HA PRIVATE UPLAND MATURE HARDWOODS. SALT MEADOWS. OVERWINTERING SWAN. ON SOUTH RIVER. EAST SHORE HAS SOME BLUFF AND VIRTUALLY NO BEACH. EROSION IS HIGH. NORTH SHORE HAS NARROW BEACH. MOSTLY UNDEVELOPED FOREST AND WETLANDS. SURROUNDING AREA IS URBANIZED. NOT ACCESSIBLE BY ROAD. 05	01268.6 HA 05	POPLAR POINT MARYLAND ANNE ARUNDEL SOUTH RIVER, MD 00052.5 HA PRIVATE UPLAND MATURE FOREST. OVERWINTERING SWAN. IN SOUTH RIVER WATERSHED UNDEVELOPED FOREST LAND. NARROW SAND BEACH ALONG CHURCH CREEK. ADJACENT LAND IS MOSTLY AGRICULTURAL. 05	01268.6 HA 05	HIGGINS POND MARYLAND DORCHESTER EAST NEW MARKET, MD 00068.7 HA PRIVATE POND MARSH. FRESHWATER
00000730	010 020 021 030 040 060 151 170	01 01 01 01 01 01 01 01	01575.6 HA 05	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I: AQUATIC TYPES! BIOTIC COMPONENTS:	01 020 021 030 040 060 170	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I: BIOTIC COMPONENTS: DESCRIPTION OF AREA: ECOLOGICAL RATING:	01 020 021 030 040 060 170	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I: BIOTIC COMPONENTS: DESCRIPTION OF AREA: ECOLOGICAL RATING:	01 020 021 030 040 060 170	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I:
00000738	010 020 021 030 040 060 170	01 01 01 01 01 01 01	01575.6 HA 05	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I: BIOTIC COMPONENTS: DESCRIPTION OF AREA: ECOLOGICAL RATING:	01 020 021 030 040 060 170	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I: BIOTIC COMPONENTS: DESCRIPTION OF AREA: ECOLOGICAL RATING:	01 020 021 030 040 060 170	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I: BIOTIC COMPONENTS: DESCRIPTION OF AREA: ECOLOGICAL RATING:	01 020 021 030 040 060 170	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I:
00000739	010 020 021 030 040 060 170 180	01 01 01 01 01 01 01 01	01575.6 HA 05	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I: BIOTIC COMPONENTS: DESCRIPTION OF AREA: ECOLOGICAL RATING:	01 020 021 030 040 060 170 180	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I: BIOTIC COMPONENTS: DESCRIPTION OF AREA: ECOLOGICAL RATING:	01 020 021 030 040 060 170 180	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I: BIOTIC COMPONENTS: DESCRIPTION OF AREA: ECOLOGICAL RATING:	01 020 021 030 040 060 170 180	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I:
00000744	010 020 021 030 040 060 151	01 01 01 01 01 01 01	01575.6 HA 05	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I:	01 020 021 030 040 060 151	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I:	01 020 021 030 040 060 151	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I:	01 020 021 030 040 060 151	NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I:

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

DATE: 10/19/73

SERIAL CATEG LINE CAT-DEFINITION

DATA

00000744	170	01 BIOTIC COMPONENTS!	ABUNDANT CRAPPIE. BLUEGILLS. BASS AND CATFISH.
	180	01 DESCRIPTION OF AREA:	IN CHOPTANK RIVER WATERSHED. ONE OF THE LARGEST PONDS IN MARYLAND. IS FOR SALE. AVERAGE DEPTH OF POND IS 1 M MAXIMUM DEPTH IS 6 M. POND IS SURROUNDED BY SHALLOW MARSH. NO PERMANENT PRESERVATION IN EFFECT.
	03		
	04		
	410	01 ECOLOGICAL RATING:	05
00000747	010	01 NAME OF AREA:	SOUTHEAST CREEK - BROWNS BRANCH
	020	01 STATE:	MARYLAND
	021	01 COUNTY:	QUEEN ANNES
	030	01 QUADRANGLE:	CHESTERTOWN, MD
	040	01 SIZE OF AREA:	00238.4 HA
	060	01 OWNER I:	PRIVATE
	151	01 AQUATIC TYPES:	MARSH. FRESHWATER
	170	01 BIOTIC COMPONENTS!	FRESHWATER MARSH WITH TYPHA SP. DIVING DUCKS.
	180	01 DESCRIPTION OF AREA:	IN CHESTER RIVER WATERSHED. PRIME WETLANDS.
	400	01 AREA INCL. BUFFER ZONE:	00824.2 HA
	410	01 ECOLOGICAL RATING:	05
00000749	010	01 NAME OF AREA:	DUNDEE CREEK
	020	01 STATE:	MARYLAND
	021	01 COUNTY:	BALTIMORE
	030	01 QUADRANGLE:	GUNPOWDER NECK, MD
	040	01 SIZE OF AREA:	00109.1 HA
	060	01 OWNER I:	PRIVATE
	151	01 AQUATIC TYPES:	MARSH, FRESHWATER
	170	01 BIOTIC COMPONENTS:	Liquidambar styraciflua. MARSH GRASS AND
	02		SHORE SLOPE IS GENTLE AND EROSION IS LOW. WATER
	160	01 DESCRIPTION OF AREA:	CLARITY IS GOOD. BACKLAND TOPOGRAPHY. FLAT. STATE PARK ON NORTH END. SHORE IS NARROW WETLANDS BACKED
	03		BY UPLAND HARDWOODS. PRIME WETLANDS.
	410	01 ECOLOGICAL RATING:	05
00000756	010	01 NAME OF AREA:	CORBINS NECK - MOSS NECK
	020	01 STATE:	VIRGINIA
	021	01 COUNTY:	KING GEORGE
	030	01 QUADRANGLE:	RAPPAHANNOCK ACADEMY, VA
	040	01 SIZE OF AREA:	00371.7 HA
	060	01 OWNER I:	PRIVATE
	151	01 AQUATIC TYPES:	MARSH. FRESHWATER
	170	01 BIOTIC COMPONENTS!	FRESHWATER MARSH COMMUNITY. ANADROMOUS FISH.
	180	01 DESCRIPTION OF AREA:	IN RAPPAHANNOCK RIVER WATERSHED. PRIME WETLANDS.
	400	01 AREA INCL. BUFFER ZONE:	00565.6 HA
	410	01 ECOLOGICAL RATING:	05
00000759	010	01 NAME OF AREA:	NOMINI CLIFFS
	020	01 STATE:	VIRGINIA

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

DATE: 10/19/73

SERIAL CATEG LINE CAT-DEFINITION

DATA

00000759	021	01	COUNTY; QUADRANGLE;	WESTMORELAND STRATFORD HALL, VA 00149.5 HA PRIVATE
	030	01	SIZE OF AREA;	
	040	01	OWNER I;	
	060	01	BIOTIC COMPONENTS!	
	170	01	DESCRIPTION OF AREA;	HIGH CLIFFS OVERLOOKING POTOMAC RIVER. IN POTOMAC RIVER WATERSHED. IMPRESSIVE LANDMARK.
	180	01		
	02	01	ECOLOGICAL RATING!	05
00000760	010	01	NAME OF AREA;	NORTH POINT MARSH
	020	01	STATE;	VIRGINIA
	021	01	COUNTY;	LANCASTER
	030	01	QUADRANGLE;	FLEETS BAY, VA
	040	01	SIZE OF AREA;	00113.1 HA
	060	01	OWNER I;	PRIVATE
	151	01	AQUATIC TYPES;	MARSH. TIDAL
	170	01	BIOTIC COMPONENTS!	HIGH TIDAL MARSH. PLANT SPECIES INCLUDE SPARTINA PATENS, DISTICHLIS SP. AND JUNCUS ROEMERIANUS. OSPREY.
	02	01	ECOLOGICAL RATING!	05
00000796	010	01	NAME OF AREA;	CEDAR POINT
	020	01	STATE;	MARYLAND
	021	01	COUNTY;	ANNE ARUNDEL
	030	01	QUADRANGLE;	SOUTH RIVER, MD
	040	01	SIZE OF AREA;	00040.4 HA
	060	01	OWNER I;	PRIVATE
	170	01	BIOTIC COMPONENTS!	UPLAND MATURE FOREST. OSPREY.
	180	01	DESCRIPTION OF AREA;	LOCATED ON SOUTH SHORE OF THE SOUTH RIVER BETWEEN GLEBE BAY AND BREWER CREEK. MOSTLY UNDEVELOPED. PENINSULA. ADJACENT LAND IS DENSE RESIDENTIAL ZONE. SHORELINE IS IRREGULAR WITH SEVERAL COVES AND INLETS
	02	01	ECOLOGICAL RATING!	05
00000817	010	01	NAME OF AREA;	STUMP POINT
	020	01	STATE;	MARYLAND
	021	01	COUNTY;	WICOMICO
	030	01	QUADRANGLE;	DEAL ISLAND, MD
	040	01	SIZE OF AREA;	00266.6 HA
	060	01	OWNER I;	PRIVATE
	151	01	AQUATIC TYPES;	MARSH. TIDAL
	170	01	BIOTIC COMPONENTS!	HIGH TIDAL MARSH AT MOUTH OF WICOMICO RIVER. EXCELLENT HABITAT FOR MIGRATORY WATERFOWL.
	02	01	DESCRIPTION OF AREA;	IN WICOMICO RIVER WATERSHED. NO IMMINENT PRESERVATION PROBLEMS. PRIME WETLANDS.
	02	01	ECOLOGICAL RATING!	05
00000823	010	01	NAME OF AREA;	GUNPOWDER FALLS. LOWER

DATE: 10/19/73

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

SERIAL CATEG LINE CAT-DEFINITION

DATA

000000823	020	01 STATE!	MARYLAND
	021	01 COUNTY!	BALTIMORE
	030	01 QUADRANGLE!	WHITE MARSH, MD!
	040	01 SIZE OF AREA!	EDGEMOOD, MD
	060	01 OWNER !;	00606.0 HA
	151	01 AQUATIC TYPES!	PRIVATE
	170	01 BIOTIC COMPONENTS!	MARSH, TIDAL
	410	01 ECOLOGICAL RATING!	TIDAL MARSH.
	010	01 NAME OF AREA!	PRIME WETLANDS.
000000625	020	01 STATE!	05
	021	01 COUNTY!	POWELL'S CREEK
	030	01 QUADRANGLE!	VIRGINIA
	040	01 SIZE OF AREA!	PRINCE WILLIAM
	060	01 OWNER !;	QUANTICO, VA
	151	01 AQUATIC TYPES!	00272.0 HA
	170	01 BIOTIC COMPONENTS!	PRIVATE
	180	01 DESCRIPTION OF AREA!	MARSH, TIDAL
	400	01 AREA INCL. BUFFER ZONE!	ANADROMOUS FISH, HERRING.
	410	01 ECOLOGICAL RATING!	IN POTOMAC RIVER WATERSHED
	010	01 NAME OF AREA!	01676.6 HA
000000648	020	01 STATE!	04
	021	01 COUNTY!	MOUNT LANDING CREEK MARSH
	030	01 QUADRANGLE!	VIRGINIA
	040	01 SIZE OF AREA!	ESSEX
	060	01 OWNER !;	MOUNT LANDING, VA
	151	01 AQUATIC TYPES!	00363.6 HA
	170	01 BIOTIC COMPONENTS!	PRIVATE
	02	03 DESCRIPTION OF AREA!	MARSH, TIDAL
	180	01 AREA INCL. BUFFER ZONE!	HIGH TIDAL MARSH WITH A FINE STAND OF SPARTINA
	400	01 ECOLOGICAL RATING!	CYNOSUROIDES. ANADROMOUS FISH, HERRING, STRIPED
	410	01	BASS.
	010	01 NAME OF AREA!	IN RAPPAHANNOCK RIVER WATERSHED
	020	01 STATE!	01090.8 HA
	021	01 COUNTY!	04
	030	01 QUADRANGLE!	LONG CREEK MARSH
	040	01 SIZE OF AREA!	VIRGINIA
	060	01 OWNER !;	HAMPTON
	151	01 AQUATIC TYPES!	HAMPTON, VA
	170	01 BIOTIC COMPONENTS!	00432.3 HA
	180	01 DESCRIPTION OF AREA!	PRIVATE
	400	01 ECOLOGICAL RATING!	MARSH, TIDAL
	410	01	HARD SHELL CLAMS
	010	01 NAME OF AREA!	SANDY BEACH
000000708	020	01 STATE!	04

HOFFLER CREEK MARSH

VIRGINIA

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

DATE: 10/19/73

SERIAL CATEG LINE CAT=DEFINITION

DATA

000000708	021	01	COUNTY!	NANSEMOND PORTSMOUTH
	030	01	QUADRANGLE!	NEWPORT NEWS SOUTH, VA
	040	01	SIZE OF AREA!	00072.7 HA
	151	01	AQUATIC TYPES!	MARSH, TIDAL
	170	01	BIOTIC COMPONENTS!	HIGH TIDAL MARSH. PLANT SPECIES INCLUDE SPARTINA PATENS, DISTICHlis SP. AND JUNCUS ROEMERIANUS. OYSTERS.
	180	02	DESCRIPTION OF AREA!	IN JAMES RIVER WATERSHED.
	400	01	AREA INCL. BUFFER ZONE!	
	410	01	ECOLOGICAL RATING!	04
000000715	010	01	NAME OF AREA!	NANSEMOND RIVER
	020	01	STATE!	VIRGINIA
	021	01	COUNTY!	NANSEMOND
	030	01	QUADRANGLE!	CHUCKATUCK, VA
	040	01	SIZE OF AREA!	01337.2 HA
	060	01	OWNER !!	PRIVATE
	151	01	AQUATIC TYPES!	MARSH, TIDAL
	170	01	BIOTIC COMPONENTS!	TIDAL MARSH, HIGH. SPARTINA CYNOSUROIDES.
	400	01	AREA INCL. BUFFER ZONE!	02735.1 HA
	410	01	ECOLOGICAL RATING!	04
000000737	010	01	NAME OF AREA!	GIBSON ISLAND
	020	01	STATE!	MARYLAND
	021	01	COUNTY!	ANNE ARUNDEL
	030	01	QUADRANGLE!	GIBSON ISLAND, MD
	040	01	SIZE OF AREA!	00048.5 HA
	060	01	OWNER !!	PRIVATE
	151	01	AQUATIC TYPES!	MARSH, FRESHWATER
	170	01	BIOTIC COMPONENTS!	FRESHWATER MARSH WITH SCIRPUS spp. WHISTLING SWAN.
	180	01	DESCRIPTION OF AREA!	SHORELINE, HIGHLY IRREGULAR WITH WETLANDS ALONG EDGE.
	02			75 PERCENT OF ISLAND IS RAPIDLY BEING DEVELOPED
	03			RESIDENTIALLY.
	400	01	AREA INCL. BUFFER ZONE!	00687.0 HA
	410	01	ECOLOGICAL RATING!	04
000000750	010	01	NAME OF AREA!	WARDS CREEK
	020	01	STATE!	VIRGINIA
	021	01	COUNTY!	PRINCE GEORGE
	030	01	QUADRANGLE!	CHARLES CITY, VA
	040	01	SIZE OF AREA!	SAVEDGE, VA
	060	01	OWNER !!	00323.2 HA
	151	01	AQUATIC TYPES!	PRIVATE
	170	01	BIOTIC COMPONENTS!	MARSH, FRESHWATER
	02			FRESHWATER MARSH SPECIES.
	180	01	DESCRIPTION OF AREA!	BASS AND HERRING.
	400	01	AREA INCL. BUFFER ZONE!	IN JAMES RIVER WATERSHED.
	410	01	ECOLOGICAL RATING!	01567.5 HA
000000754	010	01	NAME OF AREA!	04

BUSH POINT MARSH

CHESSAPEAKE BAY SURVEY REPORT
MASTER LIST

DATE: 10/19/73

SERIAL CATEG LINE CAT-DEFINITION

DATA

SERIAL	CATEG LINE	CAT-DEFINITION	NAME OF AREA!	STATE!	COUNTY!	QUADRANGLE!	SIZE OF AREA!	OWNER I!	AQUATIC TYPES!	BIOTIC COMPONENTS!	DESCRIPTION OF AREA!	AREA INCL. BUFFER ZONE!	ECOLOGICAL RATING!
000000754	020	01	VIRGINIA	Gloucester	Achilles.	VA	00134.5 HA	PRIVATE	MARSH, TIDAL, POND	SALT MARSH COMMUNITY	ON SEVERN RIVER	00166.4 HA	04
000000761	010	01	PITTS CREEK MARSH	Virginia	Accomack	Saxis, VA	00464.6 HA	PRIVATE	MARSH, TIDAL	HIGH TIDAL MARSH. PLANT SPECIES INCLUDE SPARTINA	PATENS, DISTICHLIS SP. AND JUNCUS ROEMERIANUS.	04	
000000764	010	01	WEST POINT - FINNEYS ISLAND - PARKERS ISLAND -	Virginia	Accomack	Pungoteague, VA	00282.8 HA	PRIVATE	MARSH, TIDAL	HIGH TIDAL MARSH. PLANT SPECIES INCLUDE SPARTINA	PATENS, DISTICHLIS SP. AND JUNCUS ROEMERIANUS.	04	
000000774	010	01	BEARDS CREEK	Maryland	Anne Arundel	South River, MD	00149.5 HA	PRIVATE	MARSH, FRESHWATER	FRESHWATER MARSH WITH TYPHA SP. CRABS. CLAMS.	IN SOUTH RIVER WATERSHED.	00593.9 HA	04
000000798	010	01	CALVERT CLIFFS										

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

DATE: 10/19/73

SERIAL CATEG LINE CAT-DEFINITION

DATA

00000798	020	01 STATE!	MARYLAND
	021	01 COUNTY!	CALVERT
	030	01 QUADRANGLE!	COVE POINT, MD
	049	01 SIZE OF AREA!	00101.0 HA
	060	01 OWNER !	PRIVATE
	170	01 BIOTIC COMPONENTS!	STEEP BANKS UP TO 23 M
	180	01 DESCRIPTION OF AREA!	FOSILS. GEOLOGICAL FORMATIONS.
	410	01 ECOLOGICAL RATING!	04
00000799	010	01 NAME OF AREA!	CORNFIELD POINT GEOLOGIC SECTION
	020	01 STATE!	MARYLAND
	021	01 COUNTY!	ST. MARY'S
	030	01 QUADRANGLE!	PT. LOOKOUT, MD
	040	01 SIZE OF AREA!	00048.5 HA
	060	01 OWNER !	PRIVATE
	180	01 DESCRIPTION OF AREA!	FOSILS. BLUFFS ALONG POTOMAC RIVER. EXPOSURE OF PLEISTOCENE AGE CLAY. MARINE MULLUSCAN SHELLS.
	410	01 ECOLOGICAL RATING!	04
00000801	010	01 NAME OF AREA!	GARRETT ISLAND
	020	01 STATE!	MARYLAND
	021	01 COUNTY!	CECIL
	030	01 QUADRANGLE!	HAVRE DE GRACE, MD
	040	01 SIZE OF AREA!	00072.7 HA
	060	01 OWNER !	PRIVATE
	170	01 BIOTIC COMPONENTS!	UPLAND HARDWOODS.
	410	01 ECOLOGICAL RATING!	ANADROMOUS FISH.
00000803	010	01 NAME OF AREA!	JACK BAY
	020	01 STATE!	MARYLAND
	021	01 COUNTY!	CALVERT
	030	01 QUADRANGLE!	BROOMES ISLAND, MD
	040	01 SIZE OF AREA!	00044.4 HA
	060	01 OWNER !	PRIVATE
	151	01 AQUATIC TYPES!	MARSH, TIDAL
	170	01 BIOTIC COMPONENTS!	HIGH TIDAL MARSH. CRAB.
	180	01 DESCRIPTION OF AREA!	IN PATUXENT RIVER WATERSHED.
	410	01 ECOLOGICAL RATING!	04
00000807	010	01 NAME OF AREA!	ST. PAUL'S POND
	020	01 STATE!	MARYLAND
	021	01 COUNTY!	ST. MARY'S
	030	01 QUADRANGLE!	ROCK HALL, MD
	040	01 SIZE OF AREA!	00020.2 HA
	060	01 OWNER !	PRIVATE
	151	01 AQUATIC TYPES!	POND
	170	01 BIOTIC COMPONENTS!	WOODLAND. ABUNDANT BASS AND BLUEGILL.
	180	01 DESCRIPTION OF AREA!	IN CHESTER RIVER WATERSHED. ADJACENT TO HISTORIC

DATE: 10/19/73

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

SERIAL CATEG LINE CAT-DEFINITION

DATA

000000807 180 02 NAME OF AREA:
 020 01 STATE:
 021 01 COUNTY!
 030 01 QUADRANGLE!
 040 01 SIZE OF AREA!
 060 01 OWNER !!
 151 01 AQUATIC TYPES!
 170 01 BIOTIC COMPONENTS!
 180 01 DESCRIPTION OF AREA!
 410 01 ECOLOGICAL RATING!

ST. PAUL'S CHURCH, COMPLETED IN 1713. MAXIMUM DEPTH OF POND IS 3 M. AVERAGE DEPTH 1 M. ONE OF FEW REMAINING MAJOR PONDS IN MARYLAND. NO IMMINENT PRESERVATION PROBLEMS.
 04

000000809 010 01 NAME OF AREA:
 020 01 STATE:
 021 01 COUNTY!
 030 01 QUADRANGLE!
 040 01 SIZE OF AREA!
 060 01 OWNER !!
 151 01 AQUATIC TYPES!
 170 01 BIOTIC COMPONENTS!
 180 01 DESCRIPTION OF AREA!
 410 01 ECOLOGICAL RATING!

BLACK MARSH
MARYLAND
BALTIMORE
SPARROWS POINT, MD
00290.9 HA
PRIVATE
MARSH, TIDAL
HIGH TIDAL MARSH
PRIME WETLAND
04

000000815 010 01 NAME OF AREA:
 020 01 STATE:
 021 01 COUNTY!
 030 01 QUADRANGLE!
 040 01 SIZE OF AREA!
 060 01 OWNER !!
 151 01 AQUATIC TYPES!
 170 01 BIOTIC COMPONENTS!
 410 01 ECOLOGICAL RATING!

ROBERT ISLAND - SPENCER ISLAND
MARYLAND
HARFORD
ABERDEEN, MD
00092.9 HA
PRIVATE
SWAMP
SWAMP FOREST, HARDWOODS.
04

000000816 010 01 NAME OF AREA:
 020 01 STATE:
 021 01 COUNTY!
 030 01 QUADRANGLE!
 040 01 SIZE OF AREA!
 060 01 OWNER !!
 180 01 DESCRIPTION OF AREA!
 02
 03
 04
 05
 06
 410 01 ECOLOGICAL RATING!

SANDY BOTTOM TALBOT TERRACE SCARP
MARYLAND
KENT
ROCK HALL, MD
00084.8 HA
PRIVATE
IN CHESTER RIVER WATERSHED. ONE OF FEW INLAND CLIFF - LIKE AREAS REMAINING IN MARYLAND COASTAL PLAIN. CARVED BY ADVANCES AND RETREATS OF OCEAN DURING PLEISTOCENE AGE. SUDDEN 12 M ELEVATION INCREASE WITH SECTIONS OF CLAY, PEAT, SAND AND GRAVEL EXHIBITED. NO IMMINENT PRESERVATION PROBLEMS.
 04

000000819 010 01 NAME OF AREA:
 020 01 STATE:
 021 01 COUNTY!
 030 01 QUADRANGLE!
 040 01 SIZE OF AREA!
 060 01 OWNER !!
 170 01 BIOTIC COMPONENTS!

POINT LOOK-IN
MARYLAND
ST. MARY'S
POINT LOOKOUT, MD
00024.2 HA
PRIVATE
UPLAND MATURE HARDWOODS. PINUS TAEDA, ILEX OPACA,
113

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

DATE: 10/19/73

SERIAL CATEG LINE CAT-DEFINITION

DATA

000000819	170	02	DESCRIPTION OF AREA:	
	180	01	STATE:	020 01
		02	COUNTY:	021 01
		03	QUADRANGLE:	030 01
		04	SIZE OF AREA:	040 01
	410	01	OWNER I:	060 01
		01	AQUATIC TYPES:	151 01
		01	BIOTIC COMPONENTS:	170 01
		02	DESCRIPTION OF AREA:	180 01
		03		
		04	AUTHOR:	301 01
			TITLE:	303 01
			JOURNAL VOLUME/PAGES:	304 01
		01	ECOLOGICAL RATING:	410 01
000000733	010	01	NAME OF AREA:	
	020	01	STATE:	020 01
		01	COUNTY:	021 01
		01	QUADRANGLE:	030 01
		01	SIZE OF AREA:	040 01
		01	OWNER I:	060 01
		01	DESCRIPTION OF AREA:	180 01
		01		
	000000748	010	01	NAME OF AREA:
	020	01	STATE:	020 01
		01	COUNTY:	021 01
		01	QUADRANGLE:	030 01
		01	SIZE OF AREA:	040 01
		01	OWNER I:	060 01
		01	DESCRIPTION OF AREA:	180 01
		01		
	410	01	ECOLOGICAL RATING:	
000000755	010	01	NAME OF AREA:	
	020	01	STATE:	020 01
		01	COUNTY:	021 01
		01	QUADRANGLE:	030 01
		01	SIZE OF AREA:	040 01
		01	OWNER I:	060 01
		01	DESCRIPTION OF AREA:	180 01
		01	AREA INCL. BUFFER ZONE:	400 01
		01	ECOLOGICAL RATING:	410 01
000000765	010	01	NAME OF AREA:	
	020	01	STATE:	

LIQUIDAMBAR STYRACIIFLUA.
ADJACENT LAND USED FOR SUMMER HOMES. BEACH, RELATIVELY STRAIGHT, UP TO 12 M WIDE. EROSION APPEARS LOW. WATER CLARITY IS POOR. WATER BOTTOM IS SANDY AND GENTLE CONTOUR.
04

SUITLAND BOG
MARYLAND
PRINCE GEORGES
ANACOSTIA, MD
00008. 1 HA
PRIVATE
BOG
MAGNOLIA VIRGINIANA BOG. DROSERA FILIFORMIS.
IN POTOMAC RIVER WATERSHED. SILT AND SAND HAVE WASHED INTO THE BOG. MANY OF THE TYPICAL BOG SPECIES HAVE DIED DUE TO THE SILTATION AND OTHER FACTORS OF AREA DEVELOPMENT.
SHETLER, STANWYN G.
THE SUITLAND BOG
ATLANTIC NAT. 25 (2):65-68
03

DRAYDEN GEOLOGIC SECTION
MARYLAND
ST. MARY'S
ST. MARY'S CITY, MD
00024.2 HA
PRIVATE
IN POTOMAC RIVER WATERSHED. BLUFFS WITH FOSSILS ABUNDANT, REPRESENTATIVE OF THE MIocene AGE. BLUISH SANDY CLAY AND FINE SANDSTONES. RICH IN FOSSIL GASTROPODS. NO IMMINENT PROBLEMS. NO PRESERVATION IN EFFECT.
03

BUTLERS BLUFF
VIRGINIA
NORTHAMPTON
TOWNSEND, VA
00052.5 HA
PRIVATE
ONLY BLUFF ON EASTERN SHORE
00080.8 HA
03

FOUR POINT MARSH
VIRGINIA

DATE: 10/19/73

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

SERIAL CATEG LINE CAT-DEFINITION

DATA

SERIAL	CATEG LINE	CAT-DEFINITION	DATA
000000765	021 01	COUNTY!	GLOUCESTER
	030 01	QUADRANGLE!	ACHILLES, VA
	040 01	SIZE OF AREA!	00085•2
	060 01	OWNER 1!	PRIVATE
	151 01	AQUATIC TYPES!	MARSH, TIDAL
	410 01	ECOLOGICAL RATING!	03
000000806	010 01	NAME OF AREA!	GARLAND LAKE
	020 01	STATE!	MARYLAND
	021 01	COUNTY!	CAROLINE
	030 01	QUADRANGLE!	DENTON, MD
	040 01	SIZE OF AREA!	00028•3 HA
	060 01	OWNER 1!	PRIVATE
	151 01	AQUATIC TYPES!	POND
	180 01	DESCRIPTION OF AREA!	IN CHOPTANK RIVER WATERSHED.
	410 01	ECOLOGICAL RATING!	03 PRIME WETLAND.
000000802	010 01	NAME OF AREA!	HAMBLETON CREEK
	020 01	STATE!	MARYLAND
	021 01	COUNTY!	QUEEN ANNE
	030 01	QUADRANGLE!	CHESTERTOWN, MD
	040 01	SIZE OF AREA!	00076•8 HA
	060 01	OWNER 1!	PRIVATE
	151 01	AQUATIC TYPES!	MARSH, FRESHWATER
	170 01	BIOTIC COMPONENTS!	FRESHWATER MARSH, SCIRPUS spp.
	180 01	DESCRIPTION OF AREA!	IN CHESTER RIVER WATERSHED.
	400 01	AREA INCL. BUFFER ZONE!	0282•8 HA
	410 01	ECOLOGICAL RATING!	03
000000808	010 01	NAME OF AREA!	BAY FOREST DRIVE
	020 01	STATE!	MARYLAND
	021 01	COUNTY!	ST. MARY'S
	030 01	QUADRANGLE!	POINT NO POINT, MD
	040 01	SIZE OF AREA!	00056•8 HA
	060 01	OWNER 1!	PRIVATE
	170 01	BIOTIC COMPONENTS!	UPLAND PINE, SUCCESSIONAL
	180 01	DESCRIPTION OF AREA!	NOT AN IMPRESSIVE AREA
	410 01	ECOLOGICAL RATING!	03
000000816	010 01	NAME OF AREA!	BODKIN POINT
	020 01	STATE!	MARYLAND
	021 01	COUNTY!	ANNE ARUNDEL
	030 01	QUADRANGLE!	GIBSON ISLAND, MD
	040 01	SIZE OF AREA!	SPARROWS POINT, MD
	060 01	OWNER 1!	00060•6 HA
	151 01	AQUATIC TYPES!	PRIVATE
	170 01	BIOTIC COMPONENTS!	MARSH, FRESHWATER
	410 01	ECOLOGICAL RATING!	FRESHWATER MARSH WITH TYPHA SP.
	010 01		03

DATE: 10/19/73

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

SERIAL CATEG LINE CAT-DEFINITION

DATA

000000811	010	01 NAME OF AREA! STATE!	EAST NEW MARKET BASIN
	020	01 COUNTY!	MARYLAND
	021	01 QUADRANGLE!	DORCHESTER
	030	01 SIZE OF AREA!	EAST NEW MARKET, MD
	040	01 OWNER !	00137.4 HA
	060	01 PRIVATE	CHOPTANK RIVER WATERSHED.
	180	01 DESCRIPTION OF AREA!	NATURAL RECHARGE BASIN.
	410	01 ECOLOGICAL RATING!	03
000000813	010	01 NAME OF AREA! STATE!	HART AND MILLER ISLANDS
	020	01 COUNTY!	MARYLAND
	021	01 QUADRANGLE!	BALTIMORE
	030	01 SIZE OF AREA!	SPARROWS POINT, MD
	040	01 OWNER !	00072.7 HA
	060	01 PRIVATE	PARK
	151	01 AQUATIC TYPES!	MARSH• FRESHWATER
	170	01 BIOTIC COMPONENTS!	FRESHWATER MARSH, WITH TYPHA SP.
	410	01 ECOLOGICAL RATING!	03
000000814	010	01 NAME OF AREA! STATE!	OTTER POINT CREEK
	020	01 COUNTY!	MARYLAND
	021	01 QUADRANGLE!	HARFORD
	030	01 SIZE OF AREA!	EDGWOOD, MD
	040	01 OWNER !	00315.1 HA
	060	01 PRIVATE	PARK
	151	01 AQUATIC TYPES!	MARSH• FRESHWATER
	170	01 BIOTIC COMPONENTS!	FRESHWATER MARSH, SCIRPUS spp.
	410	01 ECOLOGICAL RATING!	03
000000820	010	01 NAME OF AREA! STATE!	POPES CREEK GEOLOGIC SECTION
	020	01 COUNTY!	MARYLAND
	021	01 QUADRANGLE!	CHARLES
	030	01 SIZE OF AREA!	POPES CREEK
	040	01 OWNER !	00016.1 HA
	060	01 PRIVATE	PARK
	180	01 DESCRIPTION OF AREA!	IN POTOMAC RIVER WATERSHED. NEARLY VERTICAL BLUFF
	02	01	ON POTOMAC RIVER ABOUT 25 M HIGH. EXCELLENT EXPOSURE
	03	01	OF EOCENE, MIocene AND PLEISTOCENE GEOLoGIC LAYERS.
	04	01	CONTAINING MANY FOSSILS. WITHIN 35 MILES OF WASHINGTON
	05	01	D. C. NO IMMINENT PRESERVATION PROBLEMS.
	410	01 ECOLOGICAL RATING!	03
000000827	010	01 NAME OF AREA! STATE!	MT. VERNON TIDAL MARSH AND FLATS
	020	01 COUNTY!	VIRGINIA
	021	01 QUADRANGLE!	FAIRFAX
	040	01 SIZE OF AREA!	00161.6 HA
	060	01 OWNER !	NATIONAL CAPITAL PARKS
	151	01 AQUATIC TYPES!	TIDAL MARSH.

DATE: 10/19/73

CHEESAPEAKE BAY SURVEY REPORT
MASTER LIST

SERIAL CATEG LINE CAT-DEFINITION

DATA

SERIAL	CATEG LINE	CAT-DEFINITION	DATA
000000827	410	01 ECOLOGICAL RATING:	03
000000714	010	01 NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I: AQUATIC TYPES: BIOTIC COMPONENTS: DESCRIPTION OF AREA: AREA INCL. BUFFER ZONE: ECOLOGICAL RATING:	BENNETT CREEK MARSH VIRGINIA NANSEMOND NEWPORT NEWS SOUTH, VA BOWERS HILL, VA 00149.5 HA PRIVATE MARSH, TIDAL TIDAL MARSH WITH SPARTINA CYNOSUROIDES. IN NANSEMOND RIVER WATERSHED. 00218.1 HA 02
000000736	010	01 NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I: AQUATIC TYPES: BIOTIC COMPONENTS: DESCRIPTION OF AREA: ECOLOGICAL RATING:	BROAD CREEK MARSHES MARYLAND PRINCE GEORGES MT. VERNON, MD; ALEXANDRIA, MD 00121.1 HA PRIVATE MARSH, FRESHWATER FRESHWATER MARSH WITH SCIRPUS SPP. AND TYPHA SP. IN POTOMAC RIVER WATERSHED. SURROUNDED BY RESIDENTIAL DEVELOPMENTS. 02
000000766	010	01 NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I: AQUATIC TYPES: BIOTIC COMPONENTS: ECOLOGICAL RATING:	HACKS NECK VIRGINIA ACCOMACK NANDUA CREEK, VA 0226.2 HA PRIVATE MARSH, TIDAL HIGH TIDAL MARSH. PLANT SPECIES INCLUDE SPARTINA PATENS. DISTICHLIS SP. AND JUNCUS ROEMERIANUS. 02
000000004	010	01 NAME OF AREA: STATE: COUNTY: QUADRANGLE: SIZE OF AREA: OWNER I: AQUATIC TYPES: DESCRIPTION OF AREA: ECOLOGICAL RATING:	LINCHESTER POND MARYLAND CAROLINE PRESTON, MD 00032.3 HA PRIVATE POND IN CHOPTANK RIVER WATERSHED. 02
000000818	010	01 NAME OF AREA:	CHAPEL POINT

DATE: 10/19/73

CHESAPEAKE BAY SURVEY REPORT
MASTER LIST

SERIAL CATEG LINE CAT-DEFINITION

DATA

000000818	020	01 STATE: 01 COUNTY: 01 QUADRANGLE: 030 01 SIZE OF AREA: 040 01 OWNER I: 060 01 BIOTIC COMPONENTS! 170 01 DESCRIPTION OF AREA: 180 01 ECOLOGICAL RATING: 410 01	MARYLAND CHARLES MATHIAS POINT, MD 00028•3 HA PRIVATE UPLAND FOREST HARDWOOD SCENIC VIEW 02
000000821	010	01 NAME OF AREA: 020 01 STATE: 021 01 COUNTY: 030 01 QUADRANGLE: 040 01 SIZE OF AREA: 060 01 OWNER I: 180 01 DESCRIPTION OF AREA: 02 03 410 01 ECOLOGICAL RATING:	PORT TOBACCO MARYLAND CHARLES PORT TOBACCO, MD 00032•3 HA PRIVATE IN POTOMAC RIVER WATERSHED. OF HISTORICAL INTEREST. LARGE MARINE AT HEAD OF EMBayment. NO IMMINENT PRESERVATION PROBLEMS. 01
000000822	010	01 NAME OF AREA: 020 01 STATE: 021 01 COUNTY: 030 01 QUADRANGLE: 040 01 SIZE OF AREA: 060 01 OWNER I: 180 01 DESCRIPTION OF AREA: 02 03 410 01 ECOLOGICAL RATING:	WHITEHALL MARYLAND ANNE ARUNDEL GIBSON ISLAND, MD 00032•3 HA PRIVATE HISTORICAL INTEREST, ESTATE OF HORATIO SHARPE, EARLY GOVERNOR OF MARYLAND 01

SELGEM MASTER LIST TOTALS

NUMBER OF LINES PRINTED = 002942

NUMBER OF LINES ON FILE = 002942

NUMBER OF RECORDS PRINTED = 000232

NUMBER OF RECORDS ON FILE = 000232

INDEX I - BY STATE AND COUNTY, PAGES 120-129

CHESAPEAKE BAY SURVEY REPORT

STATE/COUNTY	NAME OF AREA	SERIAL NO.	PAGE NO.
MARYLAND, Anne Arundel	DEEP COVE CREEK	658	84
MARYLAND, Anne Arundel	SAUCON PIGEON BRANCH	660	65
MARYLAND, Anne Arundel	FRESH POINT	661	60
MARYLAND, Anne Arundel	FLAT CREEK	669	81
MARYLAND, Anne Arundel	ROUND BAY BOS	692	91
MARYLAND, Anne Arundel	GIBSON ISLAND	737	110
MARYLAND, Anne Arundel	JAYO POINT	738	106
MARYLAND, Anne Arundel	POPLAR POINT	739	106
MARYLAND, Anne Arundel	LYONS CREEK	769	102
MARYLAND, Anne Arundel	CHESTNUT POINT	770	82
MARYLAND, Anne Arundel	BEARDS CREEK	774	111
MARYLAND, Anne Arundel	CREWER POINT	775	94
MARYLAND, Anne Arundel	CEDAP POINT	796	108
MARYLAND, Anne Arundel	HARNESSE CREEK	797	89
MARYLAND, Anne Arundel	WOLKIN POINT	810	115
MARYLAND, Anne Arundel	WHITE-TAIL	822	118
MARYLAND, Anne Arundel	FLUFFY CREEK	826	95
MARYLAND, Baltimore	WINDFEE CREEK	749	107
MARYLAND, Baltimore	BLACK MARSH	809	115
MARYLAND, Baltimore	PIKE MILLFR ISLANDS	813	116
MARYLAND, CALVERT	HELLFV CREEK HEMLOCK PRESERV	311	73
MARYLAND, CALVERT	COVE POINT	668	80
MARYLAND, CALVERT	LONG COVE	790	95
			120

CHESAPEAKE BAY SURVEY REPORT

STATE/COUNTY	NAME OF AREA	SERIAL NO.	PAGE NO.
MARYLAND• CALVERT	FISHING CREEK	675	81
MARYLAND• CALVERT	DEEP LANDING	678	81
MARYLAND• CALVERT	PARKER CREEK	694	104
MARYLAND• CALVERT	KITT POINT	788	94
MARYLAND• CALVERT	CALVERT CLIFFS	798	111
MARYLAND• CALVERT	JACK BAY	803	112
MARYLAND• CALVPT:	PRINCE GEORGES: ANNE PATUXENT RIVER	609	57
MARYLAND• CAROLINE	SKELETON CREEK	732	87
MARYLAND• CAROLINE	BERRY RUN - BELL CREEK	741	101
MARYLAND• CAROLINE	FRAZIER NECK	778	67
MARYLAND• CAROLINE	CHOPTANK RIVER - LYFORD LANDING	786	68
MARYLAND• CAROLINE	GARLAND LAKE	800	115
MARYLAND• CARCLINE	LINCHESTER POND	804	117
MARYLAND• CAROLINE	HEMLOCK STAND ON MILL CREEK	812	102
MARYLAND• CAROLINE:	HUNTING CREEK	693	91
MARYLAND• CARCLINE:	TUCKAHOE CREEK	687	71
MARYLAND• CFCIL	PRINCPIO CREEK	659	85
MARYLAND• CFCIL	RED POINT	664	97
MARYLAND• CFCIL	CABIN JOHN CREEK MARSHES	667	85
MARYLAND• CFCIL	ELK RIVER	671	98
MARYLAND• CFCIL	FRAZER'S LAKE	697	91
MARYLAND• CFCIL	SCOTCHMAN CREEK	731	100
MARYLAND• CFCIL	POND CREEK	792	95
MARYLAND• CFCIL	GARRETT ISLAND	801	112

CHESAPEAKE BAY SURVEY REPORT

STATE/COUNTY	NAME OF AREA	SERIAL NO.	PAGE NO.
MARYLAND, CECIL	PEARCE CREEK	824	103
MARYLAND, CHARLES	MATTAWOMAN CREEK	672	70
MARYLAND, CHARLES	SWAN POINT NECK - WISE MARSH - NEALE SOUND - WEIR CREEK	673	76
MARYLAND, CHARLES	ZEKIAH SWAMP	674	55
MARYLAND, CHARLES	WANJEMOY CREEK - WARDS RUN	681	59
MARYLAND, CHARLES	BURGESS CREEK	683	82
MARYLAND, CHARLES	PERRY BRANCH	689	65
MARYLAND, CHARLES	PICCONAXEN CREEK	699	86
MARYLAND, CHARLES	THORN GUT MARSH	734	100
MARYLAND, CHARLES	MARSH ISLAND	745	92
MARYLAND, CHARLES	MARYLAND NECK	746	66
MARYLAND, CHARLES	CEDAR POINT NECK	777	62
MARYLAND, CHARLES	LLOYD CREEK	779	62
MARYLAND, CHARLES	POPES CREEK	782	94
MARYLAND, CHARLES	CHICAWUXEN CREEK	784	72
MARYLAND, CHARLES	DOLLY BOARMANS CREEK	787	88
MARYLAND, CHARLES	CHAPEL POINT	818	117
MARYLAND, CHARLES	POPES CREEK GEOLOGIC SECTION	820	116
MARYLAND, CHARLES	FORT TOEACCO	821	118
MARYLAND, CHARLES; PRINCE GEORGES	MATTAWOMAN CREEK, UPPER	828	79
MARYLAND, DORCHESTER	CHICONE CREEK - BIG CREEK MARSH	657	65
MARYLAND, DORCHESTER	GREEN BIFER SWAMP	670	70
MARYLAND, DORCHESTER	HELL DOOK MARSH - WORLDS END CREEK	684	86
MARYLAND, DORCHESTER	POINT NC POINT - PENKNIFE POINT - REDFIN CREEK	690	90

CHESAPEAKE BAY SURVEY REPORT

STATE/COUNTY	NAME OF AREA	SERIAL NO.	PAGE NO.
MARYLAND • DORCHESTER	BLINK-HORN CREEK	742	87
MARYLAND • DORCHESTER	HIGGINS POND	744	106
MARYLAND • DORCHESTER	SAVANNAH LAKE	771	83
MARYLAND • DORCHESTER	LOWER MARSHY HOPE CREEK	780	72
MARYLAND • DORCHESTER	EAST NEW MARKET BASIN	811	116
MARYLAND • HARFORD	OTTER POINT CREEK	814	116
MARYLAND • HARFORD	ROBERT ISLAND - SPENCER ISLAND	815	113
MARYLAND • HARFORD • BALTIMORE	GUNPOUNDER FALLS • LOWER	823	108
MARYLAND • KENT	CEDARS, THE - CHURCH CREEK - RINGGOLD POINT	665	57
MARYLAND • KENT	HOWELL POINT	679	76
MARYLAND • KENT	CYPRESS BRANCH	696	98
MARYLAND • KENT	SWAN POINT - TAVERN CREEK	773	78
MARYLAND • KENT	NICHOLS POINT	781	79
MARYLAND • KENT	MORGAN CREEK	791	83
MARYLAND • KENT	SANDY BOTTOM TALBOT TERRACE SCARP	816	113
MARYLAND • PRINCE GEORGES	SUITLAND BOG	733	114
MARYLAND • PRINCE GEORGES	BROAD CREEK MARSHES	736	117
MARYLAND • PRINCE GEORGES	PISCATAWAY CREEK	793	95
MARYLAND • QUEEN ANNE	HOOD POINT - PINEY POINT - MARSHY CREEK	662	85
MARYLAND • QUEEN ANNE	KENT POINT	663	85
MARYLAND • QUEEN ANNE	WAREHOUSE CREEK	677	76
MARYLAND • QUEEN ANNE	WYE RIVER	735	72
MARYLAND • QUEEN ANNE	ANDOVER BRANCH	740	101
MARYLAND • QUEEN ANNE	REED CREEK - GORDON POINT - WRIGHT NECK	794	61

CHESAPEAKE BAY SURVEY REPORT

STATE/COUNTY	NAME OF AREA	SERIAL NO.	PAGE NO.
MARYLAND, QUEEN ANNE	HAMLETON CREEK	802	115
MARYLAND, QUEEN ANNE ^{\$}	WYE EAST RIVER	795	68
MARYLAND, QUEEN ANNES	SOUTHEAST CREEK - BROWNS BRANCH	747	107
MARYLAND, SOMERSET	LANGFORD MARSH - RICHARDSON MARSH - MARUMSLO CREEK	680	86
MARYLAND, SOMERSET	SOUTH MARSH ISLAND	682	81
MARYLAND, ST. MARY'S	CHAPTICO RUN	656	80
MARYLAND, ST. MARY'S	KILLPECK CREEK - TRENT HALL CREEK	666	65
MARYLAND, ST. MARY'S	MEDLEY CREEK	698	98
MARYLAND, ST. MARY'S	CHERRYFIELD POINT	743	92
MARYLAND, ST. MARY'S	DRAYDEN GEOLOGIC SECTION	748	114
MARYLAND, ST. MARY'S	SPRING CREEK	772	67
MARYLAND, ST. MARY'S	ST. MARY'S RIVER	776	79
MARYLAND, ST. MARY'S	CORNFIELD POINT GEOLOGIC SECTION	799	112
MARYLAND, ST. MARY'S	NEWTON NECK	805	102
MARYLAND, ST. MARY'S	POPLAR HILL CREEK	806	68
MARYLAND, ST. MARY'S	ST. PAUL'S POND	807	112
MARYLAND, ST. MARY'S	BAY FOREST DRIVE	808	115
MARYLAND, ST. MARY'S	POINT LOOK-IN	819	113
MARYLAND, TALBOT	HARBOR COVE-LOWES POINT	676	98
MARYLAND, TALBOT	KINGS CREEK - KINGSTON LANDING	685	76
MARYLAND, TALBOT	MILES CREEK	686	57
MARYLAND, TALBOT	BARKERS CREEK	695	77
MARYLAND, TALBOT	BOW KNEE POINT	783	67
MARYLAND, TALBOT	CHOPTANK RIVER (BRUCEVILLE)	785	72
MARYLAND, TALBOT	LLOYD LANDING	789	68

CHESAPEAKE BAY SURVEY REPORT

STATE/COUNTY	NAME OF AREA	SERIAL NO.	PAGE NO.
MARYLAND, WICOMICO	NUTTERS NECK	688	86
MARYLAND, WICOMICO	REWASTICO CREEK - ROUND ISLAND - FERRY POINT	691	77
MARYLAND, WICOMICO	STUMP POINT	817	108
MARYLAND, WORCESTER	WICOMICO: SONERSE POCOMOKE RIVER SWAMP	610	55
VIRGINIA, ACCOMACK	BIG MARSH - TOBASCO ISLAND - SAVAGE ISLAND	641	84
VIRGINIA, ACCOMACK	BYRDS MARSH - PARKSLEY MARSHES	642	103
VIRGINIA, ACCOMACK	HYSLOP MARSH	647	97
VIRGINIA, ACCOMACK	PITTS CREEK MARSH	761	111
VIRGINIA, ACCOMACK	WEST POINT - FINNEYS ISLAND - PARKERS ISLAND -	764	111
VIRGINIA, ACCOMACK	HACKS NECK	766	117
VIRGINIA, ACCOMACK	TANGIER ISLAND	767	93
VIRGINIA, ACCOMACK	WHITE MARSH - SKINKERS NECK	751	93
VIRGINIA, CAROLINE	MORRIS CREEK MARSH	616	73
VIRGINIA, CHARLES CITY	PARSONS ISLAND - OLD NECK	639	69
VIRGINIA, CHARLES CITY	WEYANKE POINT	713	66
VIRGINIA, CHARLES CITY	HERRING CREEK MARSH	724	82
VIRGINIA, CHARLES CITY; JAMES CITY; NE CHICKAHMINY, LOWER - PROVIDENCE FORGE		601	56
VIRGINIA, CHESAPEAKE	NORTH LANDING RIVER SWAMP - POCATY CREEK SWAMP	638	90
VIRGINIA, ESSEX	PISCATAWAY CREEK MARSH	633	84
VIRGINIA, ESSEX	MARSH POINT - GREEN BAY - HORSE HEAD POINT	637	74
VIRGINIA, ESSEX	MOUNT LANDING CREEK MARSH	648	109
VIRGINIA, ESSEX	HOSKINS CREEK MARSH	725	92
VIRGINIA, ESSEX	PAYNES ISLAND MARSHES	762	101
VIRGINIA, FAIRFAX	POHICK - ACCOTINK CREEKS, UPPER, LOWER	624	89

CHESAPEAKE BAY SURVEY REPORT

STATE/COUNTY	NAME OF AREA	SERIAL NO.	PAGE NO.
VIRGINIA. FAIRFAX	DOGUE CREEK. UPPER	701	82
VIRGINIA. FAIRFAX	MT. VERNON TIDAL MARSH AND FLATS	827	116
VIRGINIA. GLOUCESTER	GUINEA MARSHEES	654	90
VIRGINIA. GLOUCESTER	CATLETT ISLANDS	706	87
VIRGINIA. GLOUCESTER	BUSH POINT MARSH	754	110
VIRGINIA. GLOUCESTER	FOUR POINT MARSH	765	114
VIRGINIA. GLOUCESTER, KING AND QUEEN	PORPODANK MARSH - PURTAH MARSH	620	58
VIRGINIA. HAMPTON	LONG CREEK MARSH	702	109
VIRGINIA. HENRICO	CHARLES NECK SWAMP	718	99
VIRGINIA. HENRICO, HANOVER; NEW KENT	CHICKAHOMINY. UPPER	602	61
VIRGINIA. ISLE OF WIGHT	PAGAN RIVER MARSH	649	103
VIRGINIA. ISLE OF WIGHT	RAGGED ISLAND - BALLARD MARSH	730	106
VIRGINIA. ISLE OF WIGHT; SOUTHAMPTON	BLACKWATER RIVER	605	58
VIRGINIA. ISLE OF WIGHT; SURREY	LAWNES CREEK MARSH	655	103
VIRGINIA. JAMES CITY	COLLEGE CREEK MARSH	611	96
VIRGINIA. JAMES CITY	YARMOUTH ISLANDS - SIMPSON - WRIGHT	621	63
VIRGINIA. JAMES CITY	CHISEL RUN BOG	626	74
VIRGINIA. JAMES CITY	POWHATAN CREEK	627	59
VIRGINIA. JAMES CITY	GORDON ISLAND	632	64
VIRGINIA. JAMES CITY	BIG MARSH POINT	752	93
VIRGINIA. JAMES CITY	PASSMORE CREEK	831	63
VIRGINIA. KING AND QUEEN	GARNETTS CREEK MARSH	720	66
VIRGINIA. KING AND QUEEN	GLEASON MARSH	721	105
VIRGINIA. KING AND QUEEN; KING WILLIAM	MATTAPONI RIVER. LOWER	607	56

CHESAPEAKE BAY SURVEY REPORT

STATE/COUNTY	NAME OF AREA	SERIAL NO.	PAGE NO.
VIRGINIA, KING AND QUEEN; MIDDLESEX;	G DRAGON RUN ESSEX	608	55
VIRGINIA, KING GEORGE	CHOTANK CREEK	615	59
VIRGINIA, KING GEORGE	SMOOT TRACT	622	64
VIRGINIA, KING GEORGE	PERSIMMON POINT	711	78
VIRGINIA, KING GEORGE	CLEVE MARSH	717	78
VIRGINIA, KING GEORGE	GAMBO CREEK MARSH	830	83
VIRGINIA, KING GEORGE; CAROLINE	CORBINS NECK - MOSS NECK	756	107
VIRGINIA, KING GEORGE	UPPER MACHODOC CREEK	712	104
VIRGINIA, KING WILLIAM	ELTHAM MARSH	644	75
VIRGINIA, KING WILLIAM	SWEET HALL MARSH	646	103
VIRGINIA, KING WILLIAM	COHOKE MARSH	651	97
VIRGINIA, KING WILLIAM	LEE MARSH	653	75
VIRGINIA, KING WILLIAM	BROOKS CREEK MARSH	705	99
VIRGINIA, KING WILLIAM; KING AND QUEEN	MATTAPONI RIVER, UPPER	606	84
VIRGINIA, LANCASTER	MOSQUITO ISLAND	727	105
VIRGINIA, LANCASTER	NORTH POINT MARSH	760	108
VIRGINIA, MATHEWS	WINTER HARBOR MARSH - GARDEN CREEK MARSH	650	97
VIRGINIA, MATHEWS	LILLEYS NECK	726	87
VIRGINIA, MATHEWS	RIGBY ISLAND	763	102
VIRGINIA, NANSEMOND	BENNETT CREEK MARSH	714	117
VIRGINIA, NANSEMOND	NANSEMOND RIVER	715	110
VIRGINIA, NANSEMOND; PORTSMOUTH	HOFFLER CREEK MARSH	708	109
VIRGINIA, NFW KENT	WEST ISLAND	640	70
VIRGINIA, NFW KENT	COUSIAC MARSH	643	74

CHESAPEAKE BAY SURVEY REPORT

STATE/COUNTY	NAME OF AREA	SERIAL NO.	PAGE NO.
VIRGINIA• NEW KENT	LILLY POINT MARSH	645	58
VIRGINIA• NEW KENT	HILL MARSH	652	75
VIRGINIA• NEW KENT; CHARLES CITY;	HENR CHICKAHOMINY. MIDDLE TERRAPIN POINT	603	56
VIRGINIA• NEW KENT; JAMES CITY	634	64	
VIRGINIA• NEWPORT NEWS	WARWICK RIVER	704	99
VIRGINIA• NEWPORT NEWS CITY	MULBERRY ISLAND	604	103
VIRGINIA• NORTHAMPTON	BUTLERS BLUFF	755	114
VIRGINIA• NORTHUMBERLAND	BLUFF POINT MARSH	614	63
VIRGINIA• NORTHUMBERLAND	BELL SWAMP + OWEN POND	703	77
VIRGINIA• NORTHUMBERLAND	HACK CREEK	722	92
VIRGINIA• NORTHUMBERLAND	HALL TRACT	723	100
VIRGINIA• NORTHUMBERLAND	DAMERON MARSH	757	101
VIRGINIA• PRINCE GEORGE	POWELL CREEK	729	105
VIRGINIA• PRINCE GEORGE	WARDS CREEK	750	110
VIRGINIA• PRINCE GEORGE	KENNON MARSH	758	93
VIRGINIA• PRINCE GEORGE;	UPPER CHIPOKEES CREEK	635	61
VIRGINIA• PRINCE WILLIAM	NEABSCO CREEK MARSH	623	96
VIRGINIA• PRINCE WILLIAM	POWELL'S CREEK	625	109
VIRGINIA• PRINCE WILLIAM; STAFFORD	QUANTICO CREEK	628	96
VIRGINIA• RICHMOND	CHOPAWAMSIC CREEK	829	79
VIRGINIA• RICHMOND	CAT POINT CREEK MARSH	630	89
VIRGINIA• RICHMOND; ESSEX	LITTLE CARTER CREEK MARSH	707	77
VIRGINIA• STAFFORD	BROAD CREEK MARSH	710	71
	POTOMAC CREEK	612	75

CHESAPEAKE BAY SURVEY REPORT

STATE/COUNTY	NAME OF AREA	SERIAL NO.	PAGE NO.
VIRGINIA, STAFFORD	ACCAKEEK CREEK	618	69
VIRGINIA, STAFFORD	AQUIA CREEK	709	99
VIRGINIA, STAFFORD	BRANT MARSH	753	88
VIRGINIA, SURRY	SUNKEN MEADOW	613	69
VIRGINIA, SURRY	GRAYS CREEK MARSH	619	80
VIRGINIA, SURRY	CROUCH-E'S CREEK - TIMBER NECK CREEK	631	90
VIRGINIA, SURRY	WARREN TRACT	768	88
VIRGINIA, SURRY	CHIPPOKE CREEK MARSH, LOWER	832	96
VIRGINIA, WESTMORELAND	BRIDGES CREEK MARSH	629	74
VIRGINIA, WESTMORELAND	HOLLIS MARSH	636	60
VIRGINIA, WESTMORELAND	CURRIEDMAN BAY	700	62
VIRGINIA, WESTMORELAND	NOMINI CLIFFS	759	107
VIRGINIA, WESTMORELAND; ESSEX	DRAKES MARSH - OTTERBURN MARSH	719	71
VIRGINIA, YORK	GOODWIN ISLANDS	617	89
VIRGINIA, YORK	BLACKWALNUT RIDGE - COW ISLAND	716	105

PAGE: 130

INDEX II - BY ALPHABETICAL ORDER, PAGES 131-140

CHESAPEAKE BAY SURVEY REPORT

NAME OF AREA	SERIAL NO.	PAGE NO.
ACCAKEEK CREEK	618	69
ANDOVER BRANCH	740	101
AQUIA CREEK	7C9	99
BACON RIDGE BRANCH	660	65
BARKERS CREEK	695	77
BAY FOREST DRIVE	808	115
BEARDS CREEK	774	111
BELL SWAMP - OWEN POND	703	77
BENNETT CREEK MARSH	714	117
BERRY RUN - BELL CREEK	741	101
BIG MARSH - TOBASCO ISLAND - SAVAGE ISLAND	641	84
BIG MARSH POINT	752	93
BLACK MARSH	809	113
BLACKWALNUT RIDGE - COW ISLAND	716	105
BLACKWATER RIVER	605	58
BLINKHORN CREEK	742	87
BLUFF POINT MARSH	614	63
BOOKIN POINT	810	115
BOW KNEE POINT	783	67
BRANT MARSH	753	88
BREWER POND	775	94
BRIDGES CREEK MARSH	629	74
BROAD CREEK MARSH	710	71
BROAD CREEK MARSHES	736	117

CHESAPEAKE BAY SURVEY REPORT

NAME OF AREA	S. PIAL NO.	PAGE NO.
BROOKS CREEK MARSH	795	99
BURGESS CREEK	683	82
BUSH POINT MARSH	754	110
BUTLERS BLUFF	755	114
BYRDS MARSH - PARKSLEY MARSHES	642	103
CABIN JOHN CREEK MARSHES	667	85
CALVFR CLIFFS	798	111
CAT POINT CREEK MARSH	630	89
CATLETT ISLANDS	706	87
CEDAR POINT	796	108
CEDAR POINT NECK	777	62
CEDARS, THE - CHURCH CREEK - RINGGOLD POINT	665	57
CHAPEL POINT	818	117
CHAPTICO RUN	656	80
CHARLES NECK SWAMP	718	99
CHERRYFIELD POINT	743	92
CHESTNUT POINT	770	82
CHICANUXEN CREEK	784	72
CHICKAHOMINY, LOWER - PROVIDENCE FORGE	601	56
CHICKAHOMINY, MIDDLE	603	56
CHICKAHOMINY, UPPER	602	61
CHICONE CREEK - BIG CREEK MARSH	657	65
CHIPOKES CREEK MARSH, LOWER	832	96
CHISEL RUN BOG	626	74

CHESAPEAKE BAY SURVEY REPORT

SERIAL NO.	PAGE NO.
NAME OF AREA	
CHUPAWISIC CREEK	829
CHOPTANK RIVER - LYFORD LANDING	786
CHOPTANK RIVER (BRUCEVILLE)	785
CHOTANK CREEK	615
CLEVF MARSH	717
COHOKE MARSH	651
COLFGE CREEK MARSH	611
CORBING NECK - MOSS NECK	756
CORNFIELD POINT GEOLOGIC SECTION	799
COUTIAC MARSH	643
COVE POINT	668
CROUCHES CREEK - TIMBER NECK CREEK	631
CURRIGAN BAY	700
CYPRESS BRANCH	696
DAMERON MARSH	757
DEEP COVE CREEK	658
DEEP LANDING	678
DOGUF CREEK - UPPER	701
DOLLY ECARMAIS CREEK	787
DRAGGI, FLA.	608
DRAKES MARSH - OTTERBURN MARSH	719
DRAYDEN GEOLOGIC SECTION	746
DUNDFE CREEK	749
EAST NEW MARKET BASIN	811

CHESAPEAKE BAY SURVEY REPORT

NAME OF AREA	SERIAL NO.	PAGE NO.
ELK RIVER	671	98
ELTHAN MARSH	644	75
FISHING CREEK	675	81
FLAT CREEK	669	81
FOUR POINT MARSH	765	114
FRAZER'S LAKE	697	91
FRAZIER NECK	778	67
FRESH FOND	661	60
GAMBO CREEK MARSH	830	83
GARLAND LAKE	800	115
GARNETTS CREEK MARSH	720	66
GARRETT ISLAND	801	112
GIBSON ISLAND	737	110
GLEASON MARSH	721	105
GOODWIN ISLANDS	617	89
GORDON ISLAND	632	64
GRAYS CREEK MARSH	619	80
GREEN EELER SWAMP	670	70
GUINFA MARSHES	654	90
GUNPOWDER FALLS, LOWER	823	108
HACK CREEK	722	92
HACKS NECK	766	117
HALL TRACT	723	100
HARDEFIELD CREEK	802	115

CHESAPEAKE BAY SURVEY REPORT

NAME OF AREA	SERIAL NO.	PAGE NO.
HARBOR COVE-LONES POINT	676	98
HAKNESS CREEK	797	89
HART AND MILLER ISLANDS	813	116
HELL HOCK MARSH - WORLDS END CREEK	684	86
HELLIN CREEK HEMLOCK PRESERVE	311	73
HEMLICK STAND ON MILL CREEK	812	102
HERRING CREEK MARSH	724	82
HIGGINS PCND	744	106
HILL MARSH	652	75
HOFFLET CREEK MARSH	708	109
HOLLIS MARSH	636	60
HOOD POINT - PINNEY POINT - MARSHY CREEK	662	85
HOSKINS CREEK MARSH	725	92
HOWELL POINT	679	76
HUNTING CREEK	693	91
HYSLOP MARSH	647	97
JACK EAY	803	112
KENNON MARSH	758	93
KENT POINT	663	85
KILLPECK CREEK - TRENT HALL CREEK	666	65
KINGS CREEK - KINGSTON LANDING	685	76
KITT POINT	788	94
LANGFORD MARSH - RICHARDSON MARSH - MARJMSLO CREEK	680	86
LAWES CREEK MARSH	655	103

CHESAPEAKE BAY SURVEY REPORT

NAME OF AREA	SERIAL NO.	PAGE NO.
LEE MARSH	653	75
LILLY POINT MARSH	726	87
LINCHESTER POND	645	58
LITTLE CARTER CREEK MARSH	804	117
LLOYD LANDING	707	77
LLOYD CREEK	779	62
LONG COVE	789	68
LONG CREEK MARSH	790	95
LOWER MARSHYHOPE CREEK	702	109
LYONS CREEK	780	72
MARSH ISLAND	769	102
MARSH POINT - GREEN BAY - HORSE HEAD POINT	745	92
MARYLAND NECK	637	74
MATTAPONI RIVER • LOWER	746	66
MATTAPONI RIVER • UPPER	607	56
MATTAWOMAN CREEK	606	84
MAYO POINT	672	70
MEDLFY CREEK	828	79
MILES CREEK	738	106
MORGAN CREEK	698	98
MORRIS CREEK MARSH	686	57
MOSQUITO ISLAND	791	83
	616	73
	727	105

CHESAPEAKE BAY SURVEY REPORT

NAME OF AREA	S. RIAL NO.	PAGE NO.
MOUNT LANDING CREEK MARSH	648	109
MT. VERNON TIDAL MARSH AND FLATS	827	116
MUDY CREEK	826	95
MULBERRY ISLAND	604	103
NANJEMOY CREEK - WARD'S RUN	681	59
NANSIMOND RIVER	715	110
NEABSCO CREEK MARSH	623	96
NEWTOWN NECK	805	102
NICHOLS POINT	781	79
NOMINI CLIFFS	759	107
NORTH LANDING RIVER SWAMP - PUGGATY CREEK SWAMP	638	90
NORTH POINT MARSH	760	108
NUTTERS NECK	688	86
OTTER POINT CREEK	814	116
PAGAN RIVER MARSH	649	103
PARKER CREEK	694	104
PARSONS ISLAND - OLD NECK	639	69
PASSMORE CREEK	831	63
PATUXENT RIVER	609	57
PAYNES ISLAND MARSHES	762	101
PEARCE CREEK	824	103
PERRY BRANCH	689	65
PERSIMMON POINT	711	78
PICCOWAXIN CREEK	699	86

CHESAPEAKE BAY SURVEY REPORT

NAME OF AREA	SERIAL NO.	PAGE NO.
PISCATAWAY CREEK	793	95
PISCATAWAY CREEK MARSH	633	84
PITTS CREEK MARSH	761	111
POCCOMCKE RIVER SWAMP	610	55
PUGHICK - ACCOTINK CREEKS, UPPER, LOWER	624	89
POINT LOOK-IN	819	113
POINT NO POINT - PENKNIFE POINT - REDFIN CREEK	690	90
POND CREEK	792	95
POOPES CREEK	782	94
POOPES CREEK GEOLOGIC SECTION	820	116
POFLAR HILL CREEK	806	68
POPLAR POINT	739	106
POROPOTANK MARSH - PURTAN MARSH	620	58
PORT TUBACCO	821	118
POTOMAC CREEK	612	73
FOWELL CREEK	729	105
POWELLS CREEK	625	109
POWHATAN CREEK	627	59
PRINCIPIC CREEK	659	85
QUANTICO CREEK	628	96
RAGGED ISLAND - BALLARD MARSH	730	106
RED POINT	664	97
REED CREEK - GURDON POINT - WRIGHT NECK	794	61
REWASTICO CREEK - ROUND ISLAND - FERRY POINT	691	77

CHESAPEAKE BAY SURVEY REPORT

NAME OF AREA	SERIAL NO.	PAGE NO.
RIGBY ISLAND	763	102
ROBERT ISLAND - SPENCER ISLAND	815	113
ROUND BAY BOG	692	91
SANDY BOTTOM TALBOT TERRACE SCARP	816	113
SAVANNAH LAKE	771	83
SCOTCHMAN CREEK	731	100
SKELFTON CREEK	732	87
SMOOT TRACT	622	64
SOUTH MARSH ISLAND	682	81
SOUTHEAST CREEK - BROWNS BRANCH	747	107
SPRING CREEK	772	67
ST. MARY'S RIVER	776	79
ST. PAUL'S POND	807	112
STUMP POINT	817	108
SUITLAND BOG	733	114
SUNKEN MEADOW	613	69
SWAN POINT - TAVERN CREEK	773	78
SWAN POINT NECK - WISE MARSH - NEALE SOUND - WEIR	673	76
SWEET HALL MARSH	646	103
TANGIER ISLAND	767	93
TERRAPIN POINT	634	64
THORN GUT MARSH	734	100
TUCKAHOE CREEK	687	71
UPPER CHIPOKES CREEK	635	61

CHESAPEAKE BAY SURVEY REPORT

NAT'L OF AREA	SERIAL NO.	PAGE NO.
UPPER MACHODOC CREEK	712	104
WARDS CREEK	750	110
WAREHOUSE CREEK	677	76
WARREN TRACT	768	88
WARRICK RIVER	704	99
WEST ISLAND	640	70
WEST POINT - FINNEYS ISLAND - PARKERS ISLAND -	764	111
WEYANOCHEE POINT	713	66
WHITE MARSH - SKINKERS NECK	751	93
WHITEHALL	822	118
WINTER HARBOR MARSH - GARDEN CREEK MARSH	650	97
WYE FAST RIVER	795	68
WYE RIVER	735	72
YARMOUTH ISLANDS - SIMPSON - WRIGHT	621	63
ZEKIAH SWAMP	674	55

REFERENCES

American Association for the Advancement of Science. 1963. Report of the AAAS Council Study Committee on natural areas as research facilities. Washington, D.C. 80 pp.

Audubon Society of the District of Columbia. 1953. "Washington--city in the woods." Atlantic Naturalist 9:4-29.

Beaven, G.F. and Oosting, H.J. 1939. "Pocomoke Swamp: a study of a cypress swamp on the eastern shore of Maryland." Bull. Torrey Bot. Club 66:364-389.

Barrick, S.O. et al. 1971. The Chesapeake Bay bibliography, vol. 1: The James River. IRRPOS Project Report No.3, Sea Grant Program Report No.3, and Special Scientific Report No.58 of the Virginia Institute of Marine Science. Gloucester Point.

Beers, Jr., R.F. et al. 1971. The Chesapeake Bay: report of a planning study. Submitted to the National Science Foundation by the Johns Hopkins University, University of Maryland, and the Virginia Institute of Marine Science. 219 pp.

Belknap, R.K. and Furtado, J.G. 1967. Three approaches to environmental resource analysis. Cambridge: Landscape Architecture Resource Office, Graduate School of Design, Harvard University. 102 pp.

Bergoffen, Bill, ed. 1971. Citizens program for the Chesapeake Bay: conference report, 16-18 September 1971, University of Maryland, College Park, Md. College Park: Natural Resources Institute. 86 pp.

Berlin, Roisman, and Kessler Associates. 1970. Law and taxation, a guide for conservation and other non-profit organizations. Prepared for The Conservation Foundation. Washington, D.C. 47 pp.

Braun, E.L. 1950. Deciduous forests of eastern North America. New York: Hafner Publishing Co., Inc. 596 pp.

Buckman, R.E. and Quintus, R.L. 1972. Natural areas of the Society of American Foresters. Washington, D.C.:Society of American Foresters. 38 pp.

Burt, W.H. and Grossenheider, R.P. 1964. Field guide to the mammals. Boston: Houghton Miffling Co. 284 pp.

California Advisory Commission on Marine and Coastal Resources. rev. 1969. Guide in planning and implementation of the California Ocean Area Plan. Report D of the Coastal and Tidelands Committee. 5 pp.

Carlson, C.W. 1968. "Tilghman Island and western Talbot County, Maryland." *Atlantic Naturalist* 23(9):91-95.

Chappuie, L.E., Happer, J. and Whitehead, D.D. 1971. Tourism and industrial potentials: Virginia's eastern shore. Parts I and II. Prepared for the Division of State Planning and Community Affairs, Commonwealth of Virginia. Lexington: Spindletop Research. 141 pp.

Chick, Jr., W.D. 1955. "Nature study opportunities in the Potomac River Basin: flora and fauna." *Atlantic Naturalist* 10(3):138-144.

Cohen, S.M. and McErlean, A.J. 1972. A cross-referenced index to current (1971-72) biological and biology related research on Chesapeake Bay. Washington, D.C.: Smithsonian Institution; College Park: University of Maryland; and Gloucester Point: Virginia Institute of Marine Science. 60 pp.

_____. 1972. Addendum to: a cross-referenced index to current (1971-72) biological and biology-related research on Chesapeake Bay. Washington, D.C.: Smithsonian Institution; College Park: University of Maryland; and Gloucester Point: Virginia Institute of Marine Science. 161 pp.

Conant, R. 1958. A field guide to reptiles and amphibians. Boston: Houghton Mifflin Co. 366 pp.

Davies, W.E. 1964. "The future of the Potomac: a conflict in values." *Atlantic Naturalist* 19:209-220.

Fenneman, N.M. 1938. Physiography of eastern United States, New York: McGraw Hill Publishing Co. 714 pp.

Ferguson, R.H. 1967. The timber resources of Maryland. USDA Resource Bulletin NE-7. Upper Darby: Northeastern Forest Experiment Station, Forest Service. 93 pp.

Flakne, J.T. 1970. "Virginia's Mason Neck." *Atlantic Naturalist* 25(2):59-64.

Fuller, S. and Hart, Jr., C.W. 1972. "Changes along the Patuxent." *Frontiers* 36(3):1-7.

Gerlach, A.C., ed. 1970. The national atlas of the United States of America. Washington, D.C.: Government Printing Office. 41 pp.

Gilman, E.M. 1957. "Grasses of the Tidewater-Piedmont region of northern Virginia and Maryland." *Castanea* 22:1-105.

Goodwin, R.H. and Niering, W.A. 1971. Inland wetlands of the United States evaluated as potential natural landmarks. 2 vols. National Park Service Contract No. 14-10-9-900-114. Washington, D.C.: U.S. Department of the Interior.

Grumman Ecosystems and Smithsonian Institution. 1971. Proposal for wetlands inventory and mapping program for the Department of Chesapeake Bay Affairs, State of Maryland. vol. 1. Washington, D.C. and Bethpage, New York. 45 pp., appendices.

Hamilton, Jr., W.J. 1943. The mammals of eastern United States. Ithaca: Comstock Publishing Co. 432 pp.

Hammond, E.H. 1964. "Classes of land surface form in the forty-eight states, U.S.A." *Annals of the Association of American Geographers* 54(1): map supplement no. 4.

Handley, Jr., C.O. and Patton, C.P. 1947. "Wild mammals of Virginia." Richmond: Commission on Game and Inland Fisheries, Commonwealth of Virginia. 22 pp.

Hargis, Jr., W.J. and Biggs, F.C. 1970. VIMS factfolder. Gloucester Point: Virginia Institute of Marine Science. 241 pp.

Hermann, F.J. 1946. A checklist of plants in the Washington-Baltimore area, 2nd ed. Conference on district flora, Smithsonian Institution, Washington, D.C. 134 pp.

Higgins, E.A.T., Rappleye, R.D. and Brown, R.G. 1971. The flora and ecology of Assateague Island. University of Maryland Agriculture Experiment Station Bulletin No. A-172. College Park. 70 pp.

Hitchcock, A.S. and Standley, P.C. 1919. Flora of the District of Columbia and vicinity. Contrib. U.S. Natl. Herb. 21. 329 pp., plates.

Hotchkiss, N. and Stewart, R.E. 1947. "Vegetation of the Patuxent Research Refuge, Maryland." *American Midland Naturalist* 38(1): 1-75.

Jones, G.S. and Klimkiewicz, M.K. 1971. "Mammals of Mason Neck." *Atlantic Naturalist* 26(3):108-114.

Kellogg, C., ed. 1957. Soil--the 1957 yearbook of agriculture. Washington, D.C.: U.S. Dept. of Agriculture. 784 pp.

Kerby, C. and McErlean, A., compilers. no date. Scientific personnel resource inventory: list and index to research scientists involved with the estuarine environment, especially the Chesapeake Bay. Washington, D.C.: Smithsonian Institution; College Park: University of Maryland; and Gloucester Point: Virginia Institute of Marine Science. 178 pp.

Knight, H.A. and McClure, J.P. 1967. Virginia's timber. USDA Resource Bulletin SE-8. Asheville: Southeastern Forest Experiment Station, Forest Service. 47 pp.

Krauss, R.W. 1971. Checklist of the plant species of the Chesapeake Bay occurring within the hightide limits of the bay and its tributaries. University of Maryland, Department of Botany Technical Bulletin 2002. College Park. var. pp.

Laessle, A.M. 1958. "The origin and successional relationships of sandhill vegetation and sand-pine scrub." Ecol. Monogr. 28(4): 361-387.

Lindzey, A.A., Schmelz, D.V. and Nichols, S.A. 1969. Natural areas in Indiana and their preservation. Lafayette: The Indiana Natural Areas Survey. 594 pp.

Mansueti, R. 1955. "Highlights of the natural history of Calvert County." Atlantic Naturalist 10(2):61-75.

Marlowe, Jr., G.A. 1950. Floristic variation in the Suitland Bog. MS Thesis No. 3426, George Washington University, directed by Prof. Yocom. Washington, D.C. 74 pp., diagrams, tables.

Maryland State. 1968. Proceedings of the Governor's Conference on Chesapeake Bay. Papers presented at the Wye Institute, Cheston on Wye, Maryland, 12-13 September 1968. var. pp.

Maryland State. 1965. Classification and inventory of wildlife habitats in Maryland. Prepared by the State Planning Department with Maryland Department of Game and Inland Fish and Bureau of Outdoor Recreation, U.S. Dept. of Interior. Baltimore. 74 pp.

Maryland State, Department of Forests and Parks. 1966. Maryland State Parks, a master plan for outdoor recreation, 1967-76. . Prepared in cooperation with the Maryland State Planning Department and Governor's Master Plan Commission on State Parks. Annapolis. 26 pp.

Maryland State, Department of Natural Resources. 1970. A guide to Maryland's public hunting areas. Annapolis. 49 pp.

Maryland State, Department of State Planning. 1970. Outdoor recreation and open space concept plan, I. Annapolis. 62 pp.

_____. 1970. Maryland outdoor recreation and open space comprehensive plan, phase II. Annapolis. 120 pp.

_____. 1970. Scenic rivers--Maryland. Publication No. 161. Prepared with the Scenic Rivers Review Board. Annapolis. 40 pp.

_____. 1972. Integrity of the Chesapeake Bay. Prepared with the Urban Research and Development Corporation. Comprehensive Planning Assistance Project No. MD.P-92. Baltimore. 52 pp.

Massey, A.S. 1961. Virginia flora. Virginia Agric. Exp. Station Tech. Bull. 155. 258 pp.

Maxon, W.R. 1935. "Natural history of Plummers Island, Maryland: introduction." Proc. Biol. Soc. Washn. 48:115-117.

McQueen, S.H. 1971. "To prevent the despoliation and destruction thereof ..." Maryland Conservationist, September-October 1971:9-13.

Metzar, R.G., ed. 1968. Catalog of natural areas in Maryland. Baltimore: Maryland State, Department of State Planning. 108 pp.

Murray, G.E. 1961. Geology of the atlantic and gulf coastal province of north America. New York: Harper and Brothers. 692 pp.

National Aeronautics and Space Administration, Scientific and Technical Information Office. 1972. Remote sensing of the Chesapeake Bay: a conference held at Wallops Station, Virginia, 5-7 April 1971. Washington, D.C. 179 pp.

Norton, J.B.S. and Brown, R.G. 1946. "A catalog of vascular plants of Maryland." Castanea 11:1-50.

Paradiso, J.L. 1969. Mammals of Maryland. North American Fauna No. 66. Washington, D.C.: Bureau of Sport Fisheries and Wildlife, U.S. Department of the Interior. 193 pp.

Penfound, W.T. 1952. "Southern swamps and marshes." Botanical Review 18(6):413-446.

Peterson, R.T. 1947. A field guide to the birds. Boston: Houghton Mifflin Company. 230 pp.

Randall, C.E. and Edgerton, D.P. 1938. Famous trees. USDA Misc. Pub. 295. Washington, D.C. 115 pp., plates.

St. Mary's Commission. 1969. Outline plan for preservation and development of ancient St. Mary's City. 2nd ed. St. Mary's City. 32 pp.

Shelford, V.E. 1963. The ecology of north America. Urbana: University of Illinois Press. 610 pp.

Shetler, S.G. 1970. "The Suitland Bog." Atlantic Naturalist 25(2): 65-68.

Shields, Jr., W.H. 1971. Pollution in Maryland. DHMH-597. Baltimore: Division of Solid Wastes, Department of Health and Mental Hygiene, Maryland State. 8 pp.

Shreve, F. et al. 1910. The plant life of Maryland. Maryland Weather Service, vol. 3. Baltimore: Johns Hopkins Press. 533 pp., plates, maps, tables, annotated checklist.

Smith, R.L. 1966. Ecology and field biology. New York: Harper and Row, Publishers. 686 pp.

Smithsonian Institution, Johns Hopkins University, and University of Maryland. 1970. An ecosystem analysis and studies on the development of a land use plan for the Rhode River Watershed. Proposal submitted to the National Science Foundation, F.S.L. Williamson, Principal Investigator.

Spinner, G.P. 1969. "The wildlife wetlands and shellfish areas of the atlantic coastal zone." Serial Atlas of the Marine Environment, Folio 18. American Geographic Society.

Stewart, R.E. 1962. Waterfowl populations in the upper Chesapeake Region. Special Scientific Report--Wildlife No. 65. Washington, D.C.: Bureau of Sport Fisheries and Wildlife, U.S. Department of the Interior. 208 pp., maps.

Tennyson, P.A. et al. 1972. The Chesapeake Bay bibliography, vol. II: Virginia waters. Special Scientific Report No. 63 of the Virginia Institute of Marine Science. Gloucester Point. 620 pp.

U.S. Congress. 1970. The national estuarine pollution study. Report of the Secretary of the Interior. 91st Congress, 2nd Session, 25 March 1970.

U.S. Department of Agriculture, Forest Service. 1972. National forest system: areas as of June 30, 1972. File 1350(5400). Washington, D.C. 20 pp.

U.S. Department of the Army, Corps of Engineers and Advisory Group to the Chesapeake Bay Study. 1970. The Chesapeake Bay: plan of study. Baltimore District. 94 pp.

U.S. Department of the Interior, Bureau of Land Management. 1971. Public land statistics. Washington, D.C.: Government Printing Office. 188 pp.

_____, Bureau of Outdoor Recreation. 1970. The Potomac--a model estuary. Washington, D.C. 116 pp.

_____, Bureau of Sports Fisheries and Wildlife. 1969. Wildlife research--problems, programs, progress, 1969. Resource Publication No. 94. Washington, D.C.: Government Printing Office. 105 pp.

_____. 1971. Annual report of lands under control of the Bureau of Sports Fisheries and Wildlife as of June 30, 1970. Compiled by the Division of Realty, USDI. Mimeographed. Washington, D.C. 20 pp.

_____. 1970. National estuary study, vols. 1-7. Washington, D.C.: Government Printing Office.

_____. 1970. National wildlife refuges 1970. Resource Publication No. 97. Washington, D.C. 16 pp.

_____. 1970. Annual progress report, calendar year 1970. Laurel: Patuxent Wildlife Research Center. 303 pp.

_____. 1971. National wildlife refuges in the southeast, Region 4. Refuge Leaflet 67-4. Washington, D.C.: Government Printing Office. 12 pp.

_____. 1973. Threatened wildlife of the United States. Compiled by the Office of Endangered Species and International Activities, USDI. Washington, D.C. 289 pp.

U.S. Department of the Interior, Federal Committee on Research Natural Areas. 1968. A directory of research natural areas on Federal lands of the United States of America. Washington, D.C.: Government Printing Office. 129 pp.

U.S. Department of the Interior, National Park Service. 1966.
Themes for survey and evolution of natural areas. Unpublished
paper available upon request from Federal Committee on Research
Natural Areas, USDI, Washington, D.C.

. 1971. The natural landmark program. Washington, D.C.:
Government Printing Office.

. 1972. Part one of the National Park System: history.
Washington, D.C.: Government Printing Office. 164 pp.

. 1972. Part two of the National Park System: natural
history. Washington, D.C.: Government Printing Office. 140 pp.

. 1972. National parks and landmarks: areas administered
by the National Park Service and related properties as of
January 1, 1972. Washington, D.C.: Government Printing Office.
192 pp.

University of Rhode Island, Marine Experiment Station. 1973.
Coastal and offshore environmental inventory. Marine Publication
No. 2. Kingston. var. pp.

Vernberg, F.J., compiler. 1963. "Field stations of the United States."
American Zoologist 3(3):245-456.

Virginia Institute of Marine Science. 1971. Research on Chesapeake
Bay and contiguous waters of the Chesapeake Bight of the
Virginia Sea. Special Scientific Report No. 49. Gloucester
Point and Wachapreague. 192 pp.

Virginia State, Commission on Outdoor Recreation. 1970. Virginia's
scenic rivers. Richmond. 24 pp.

. 1970. The Virginia Outdoors Plan, vols. 1-4. Richmond.

Virginia State, Division of State Planning and Community Affairs.
1972. Critical environmental areas. Richmond.

Vokes, H.E. 1957. Geography and geology of Maryland. Dept. Geol.
Mines and Water Resources Bulletin 19. 243 pp.

Wass, M.L. and Wright, T.D. 1969. Coastal wetlands: interim report
of the Governor and General Assembly. Special Report in Marine
Science and Ocean Engineering No. 10. Gloucester Point: Virginia
Institute of Marine Science. 154 pp.

Wells, J.P. 1972. Relative priority of natural areas in a protection
program. Boston: New England Natural Resources Center. Mimeographed.
34 pp.

APPENDIX A

DESCRIPTION OF THE CHESAPEAKE BAY REGION

by

Stephen L. Keiley
Director, Center for Natural Areas

Center for Natural Areas
Ecology Program
Smithsonian Institution

June, 1973

DESCRIPTION OF CHESAPEAKE BAY REGION

The Chesapeake Bay area as shown on the accompanying maps including the tidewater counties of Maryland, Virginia, and Delaware covers an area of about 100 by 200 miles or about 20,000 square miles. This area is divided as follows (Jenkins, 1971):

	<u>Square Miles</u>
Maryland	6800
Virginia	6700
Delaware	2100
Chesapeake Bay and tributaries	4400
Total	20000

The name Chesapeake is derived from its original Indian name, and literal interpretations vary from "Great Waters" to "Mother of Waters", all refer to its immense size (Shands and Mathes, 1972), and, in fact, Chesapeake Bay is the largest estuary on the East Coast, and with its tributaries it is considered by some scientists to be the greatest estuarine system in the world. Four major rivers and 50 large tributaries drain into Chesapeake Bay from headwaters in New York, Pennsylvania, West Virginia, Delaware, Maryland, and Virginia. The shoreline (particularly the western edge) is irregularly digitated by the tidal river estuaries. The tidal shore line is about 4,600 miles in length, of which 3,400 are miles in Maryland and 1,200 miles in Virginia (Corps, 1970).

The Bay has a drainage basin of 74,000 square miles an area larger than all of New England. The Susquehanna River (largest river in the eastern U. S.) contributes 49 percent of the annual freshwater runoff of the entire Bay, and 87 percent of that north of the mouth of the Potomac. The Potomac River estuary contributes about 18 percent of the total freshwater inflow into the Bay. The annual contribution by the other western rivers are: James - 16 percent; Rappahannock - 4 percent; York - 2 percent; and others - 4 percent. The eastern rivers (Choptank, Nanticoke and Wicomico) contribute only 7 percent of the total runoff (Saila, 1973).

The mean tidal fluctuation in Chesapeake Bay is small, generally between one and two feet. Saline water intrusion is highest along the eastern side of the estuary due to the influence of the Coriolis force. Salinities range from 35 parts per thousand inside the mouth of the bay to near zero at the north end of the bay and at the heads of embayments tributary to the bay. Spring floods and the relatively dry fall

periods contribute to seasonal variations in salinity throughout the Bay.

The Chesapeake Bay study area lies entirely within the Atlantic Coastal Plain, and is underlain by a thick, wedge-shaped series of sedimentary formations which strike northeast and dip gently toward the southeast. These "soft" rocks are composed of mostly unconsolidated beds of sands, clays, marls, and gravels, which range from Lower Cretaceous to Recent in age. The base upon which these sedimentary formations rest is composed of very ancient, predominantly pre-Cambrian, crystalline rocks upon which a prolonged pre-Cretaceous erosion cycle produced a peneplained surface. Along the inner westernmost edge of the Coastal Plain, the crystalline rocks emerge from beneath the overlapping unconsolidated formations along a line of demarcation known as the "Fall Line" which marks the head of navigation on some tributaries to Chesapeake Bay, such as the Patapsco River at Baltimore, the Potomac River at Washington, and the Rappahannock River at Fredericksburg, Virginia. The Fall Line also marks a topographic change westward, from the flat or gently rolling low elevation of the Coastal Plain to the higher elevated, bolder relief of the Piedmont Plateau (Corps, 1970).

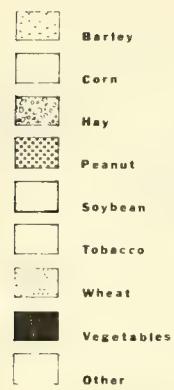
Of the 20,000 square miles of the Chesapeake Bay region, 15,600 square miles are land. Table 1 shows the distribution of this land into forests, agricultural land, pasture, urban areas, and marsh wetlands.

The forest land covers an area of slightly over 6 million acres or 9450 square miles. Forests include 68 percent of the tidewater counties of Maryland, 60 percent of Virginia and 48 percent of Delaware. The total value of the cut timber (stumpage) is about \$13 million in Maryland, \$13 million in Virginia, and \$0.5 million in Delaware.

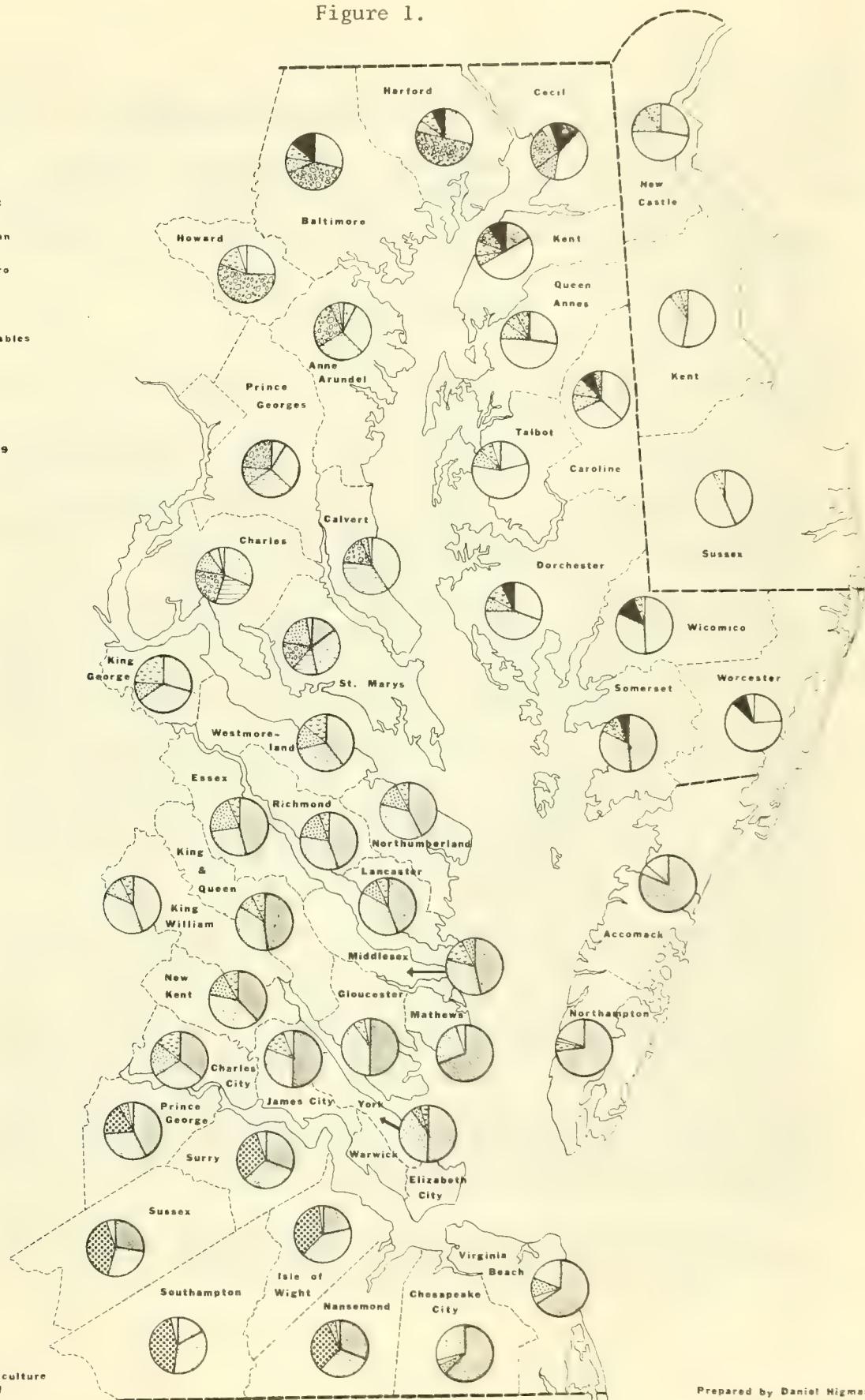
The forests of the Chesapeake Bay include the combination of oak, hickory, and pine as the major type, but, in the southern part, the combinations are oak with hickory, oak with pine, loblolly pine with shortleaf pine, and oak with gum and cypress. In many areas with better soils there are a large number of mixed mesophytic deciduous species with maple, tulip tree, beech, gum, various species of oak, flood plain species of ash, elm, maple, sycamore, birch, and many other species. The main timber trees are red and white oak, tulip tree, pine, sweetgum, and various other hardwoods.

OF DELAWARE, MARYLAND, AND VIRGINIA

Figure 1.



Data for 1969



Data from
Maryland State
Board of Agriculture
Virginia Dept. of
Agriculture & Commerce

Prepared by Daniel Higman
Smithsonian Institution

TABLE 1. - LAND USE IN CHESAPEAKE STUDY AREA

Use	Maryland (percent)	Virginia (percent)	Delaware (percent)
Forest	68	60	48
Agricultural Crops	23	23	32
Pasture	6	2	2.5
Urban/industrial	3	6	9
Coastal marsh	-	-	8.5

The agricultural cropland of the tidewater counties covers an area of 3670 square miles. The agricultural cropland of the Bay region in Maryland is 23 percent, in Virginia 23 percent, and in Delaware 32 percent. The value of agricultural crops and livestock of this region is an estimated \$500 million dollars.

Figure 1 shows the agricultural crops of the Chesapeake Bay region. These include mainly corn, soybeans, barley, potatoes, tobacco, peanuts, hay, and tomatoes and other vegetables. The eastern shore of Maryland is agriculturally suited for truck crops because of its sandy productive soil, sufficient water, and long growing period. The most important crops are soybeans, corn, wheat, and vegetable crops. On the western shore of Maryland the major crops are hay, corn, tobacco, wheat, and some soybeans, and vegetables. In the Virginia region, the main agricultural crops are corn, soybeans, peanuts, wheat, barley, and tobacco. In the Delaware area the main crops are corn, soybeans, hay, barley, rye, oats, and lima beans, and other vegetables.

Extensive vegetation along the Chesapeake Bay shoreline includes salt marshes and wetlands. This vegetation is estimated to be 8.5 percent of the land area in Delaware alone. Recent studies show the wetlands comprise 152,000 acres in Virginia (Wass and Wright, 1969), and 84,000 acres in Maryland (McHarg, 1972). Other sources indicate that there are perhaps as much as 500,000 acres of wetlands in the Bay area (USDI, 1970). These wetlands are of great importance to wildlife and production of aquatic life. The main vegetation is grass of various types, saltbush, cattail, and many other species of plants. Salt grass is mowed in some of the regions and is valuable for mulch and other uses (Jenkins, 1971).

The climate of the Bay region is moderate with average annual temperature varying a few degrees from the northern to the southern end of the Bay. The average annual temperature is 55°F in the north,

with an average of 190 frost-free days annually to 60°F in the south with an average of 210 frost-free days.

Normal annual total precipitation is 44 inches throughout the Bay region. Prolonged droughts are rare but short dry spells prompt the use of supplemental irrigation for the production of crops (Forest Service and Soil Conservation Service, 1972).

USES AND PRESSURES

Chesapeake Bay has provided man with food, wealth, an easy means of travel, and satisfaction for some 5,000 years. The Indians reaped a rich harvest of fish and shell fish, gathered shells for making trading wampum, and plied its seemingly endless waterways in their dugout canoes.

The imprint the Indians made was small indeed-so small that evidence of their long tenure is difficult to find. Far different have been their European successors. Great changes have been wrought. Changes are still being made. Yet amid these changes there are still many areas of the Bay that appear virtually untouched. Others look much like they must have in Colonial times. The Chesapeake estuary retains fragments of all the different eras that have occurred from the most primitive to the most modern.

Although the major uses of the Chesapeake have changed little, the techniques by which the uses are effected have undergone considerable modification. Often uses are in direct conflict with each other. However, the estuary is so vast and the uses are so varied that the Bay has accommodated most of them. In the past few decades however, it has become increasingly apparent that even this vast area is being transformed. Some of these changes are hardly evident and others have profound effects far from the locations being changed - and many are in the best interests of only a few people but at the expense of many.

The population pressure on the Bay is increasing. The Chesapeake estuary is the southern anchor of the Atlantic coastal megalopolis that sprawls from Massachusetts to Virginia. The ports of Baltimore and Hampton Roads, their satellite cities and the others that have developed around the Bay supported 11 million people in 1960 - a population expected to more than double in the next 40 years. An additional 3 1/2 million people live within a day's drive from the Bay.

Waterborne commerce has always been among the most important

uses for the Chesapeake estuary. Approximately 110 million tons move annually over the waterway and contribute, in large measure, to the economy of an 11 state area, extending into the Midwest, (U.S.D.I., 1970).

The port of Baltimore alone handles nearly 50 million tons annually and if the annual increase in freight traffic in the harbor is maintained, freight traffic tonnage will triple by the year 2000. A recent survey showed that the commercial complex making up the port of Baltimore directs \$1.56 billion a year into Maryland's economy, which represents 11.7 percent of the Maryland gross State product (McHarg, 1972).

The trend in commercial navigation is toward larger ships, which in turn require deeper channels, posing greater problems locating dredge spoil disposal areas. Modifying channel geometry may cause increases in upstream salinity, and unwise disposal of spoil can have marked effects on living marine organisms. It is estimated that the raw sewage discharged into the Bay by ships in transit is equivalent to that of a community of twenty-five thousand people, constantly.

Fishing is another important industry with Bay-wide significance. The region is one of the richest fish and wildlife habitats in the world and as such, it is a most important seafood harvesting area. More than 400 million pounds of fish and shellfish worth \$30 million were taken from Bay waters in 1966. The weight of fish landed was almost triple that of shellfish with nearly 304 million pounds of fish harvested as compared to 125 million pounds of shellfish. But the value of fish was only \$7.3 million, or less than one third of the value of the shellfish which netted \$22.2 million. Oysters alone represented \$15 million, or one half the value of the total fisheries harvest. Of the finfish the menhaden catch was the largest with 243 million pounds worth \$3.9 million.

TABLE I. COMMERCIAL FISHERY 1966

Type	Pounds	Value
Finfish	303.5 mil	\$7.3 mil
Oysters	20	15
Clams	8	2.1
Crabs	95	6.8

Superimposed on the heavy commercial seafood harvest is a growing recreational fishery. In 1966 it was estimated that Bay anglers caught 22 million pounds of fish and generated about \$10 million in expenditures.

Strategically positioned in the Atlantic Flyway, Chesapeake Bay is very important in the migratory bird pattern. Most of the waterfowl produced on both sides of the James and Hudson Bays all the way up to Greenland funnel into the Chesapeake marshes on their southward migration. As a wintering area for waterfowl, the Chesapeake salt marshes have few equals. More than 75 percent of the wintering population of Atlantic Flyway Canada geese occurs on or near tide water, from Kent County in Delaware to Hyde County in North Carolina. The marshes and grain fields of the Delmarva Peninsula are particularly attractive to Canada geese and to grain feeding black ducks and mallards. In the early fall, home is the Susquehanna flats for huge flocks of American widgeon. Several species of diving ducks including the canvasback, redhead, ring-necked duck, and sometimes, scaup, winter on Chesapeake Bay from the Susquehanna flats south to the confluence of Bay and ocean at the tip of the Delmarva Peninsula. About half of the 80,000 whistling swans in North America winter on the estuaries of Chesapeake Bay and Currituck Sound. Much of the breeding area in the Atlantic Flyway is still wild and remote. It can be counted on to send hundreds of thousands of new birds winging down the flyway each fall. But good wintering areas, adjacent to preferred feeding grounds, are relatively scarce, and as human populations inevitably expand, the size, number, and quality of these wintering areas will diminish accordingly. At present, Chesapeake Bay provides some of the best and most heavily used waterfowl wintering habitat remaining in the Flyway.

The Atlantic Flyway has more than 32 million acres of wetland habitat and 96 percent of it is located from Maryland south. Only 4 million acres are of moderate to high value for waterfowl, and only 2 1/2 million acres are salt-marsh, the type of high-quality waterfowl habitat found in the Chesapeake Bay. Estimates vary, but the bay area encompasses roughly one-third of a million acres of salt-marsh habitat of which about one-quarter of a million acres is of moderate to high value for waterfowl. Public owned wetlands in the Chesapeake Bay area total about 95,000 acres. Most of this habitat too, is high in quality and supports large populations of wintering birds. An additional 55,000 acres of quality marsh is owned and managed by approximately 380 private waterfowl hunting clubs. Thus, about 150,000 acres or approximately half of the salt-marsh in Chesapeake Bay is managed specifically for waterfowl and is likely to continue to be managed for this purpose in the foreseeable future.

In recent years, Chesapeake Bay has wintered approximately 550,000 ducks and 350,000 geese which provided an estimated 250,000 man-days of waterfowl hunting and 275,000 birds in the bag. Nearly 100,000 Canada geese, the king of waterfowl, are harvested on Chesapeake Bay, the queen of bays (USDI, 1970).

Erosion and siltation constitutes a significant problem for the Bay region. The earth lost from the land to the Bay has hurt the farmers who need the soil for their crops, the shippers whose vessels must navigate shoaling channels, and the fishermen whose aquatic harvest is being stifled and lost.

Evidence derived from early charts and maps, from historical documents, and from field studies and borings indicates that the rate of sedimentation in different portions of the Chesapeake Bay has varied over historic time. Prior to settlement by colonists and the initiation of land clearing and agriculture, rates of sediment contribution from land under forest cover were perhaps on the order of 100 tons/sq.mi./yr. However, with the advent of extensive clearing for agriculture, these rates rose rapidly to values of 400 to 800 tons/sq.mi./yr. As early as the latter part of the seventeenth century visitors to colonial America noted both the erosion of the fields and the muddy character of the freshets. In addition, they observed the rapid siltation taking place in a number of the early colonial harbor and river towns (State of Maryland, 1968).

The Potomac and Susquehanna Rivers transport the major sediment loads deposited within the Chesapeake Bay system. The sediment contribution of the Susquehanna is considerably moderated by the hydroelectric dams between Harrisburg, Pennsylvania, and Conowingo, Maryland, in that these reservoirs trap a significant amount of sediment moving downstream. The Susquehanna watershed is estimated to supply some 600 thousand tons per year, or approximately 23 tons per square mile. The largely unregulated Potomac River Basin, on the other hand, contributes an estimated 2.5 million tons per year to the estuarine system. This is approximately 170 tons per square mile (Corps, 1970).

The fact that each tributary entering the Chesapeake Bay deposits the bulk of its sediment load in the vicinity of its entrance to the Bay constitutes an obvious economic "fact of life" for the economy of the Bay itself. Perhaps the most striking illustration is provided by the Potomac and the Anacostia Rivers in the vicinity of the nation's capitol where channel improvement and dredging operations have been virtually continuous since 1804. Much of the land adjacent to the river including Haynes Point, the parkland along the Anacostia River, and the National Airport are all made of sediments dredged from the rivers. It is estimated that the annual cost of dredging on the Potomac is on the order of \$150,000 per year (State of Maryland, 1968).

Recently it has become evident that increasing urbanization and accompanying construction activities on the landscape may contribute immense quantities of sediment to local areas. It is estimated that of the million tons per year in the Potomac at Washington, approxi-

mately 25-30 percent is derived from construction sites in the metropolitan region. Inasmuch as population can be expected to continue to burgeon in many areas surrounding the Chesapeake Bay, construction activities can also be expected to increase. This in turn will transform the landscape and may lead to the addition of uncontrolled quantities of silt to the estuarine tributaries (State of Maryland, 1968).

Shoreline erosion also contributes to the silt load and is the single most dramatic, and most readily apparent geomorphological process occurring in the Bay. Historical data, though somewhat spotty, provides some perspective. It has been estimated that, along the 230 miles of Maryland's primary Bay shoreline, some 6,000 acres of land have been lost to the sea between 1845 and 1942. Recent rates of erosion loss are estimated to be approximately 0.17 acres/mile/year in the northern Bay area and 0.34 acres/mile/year in Maryland's southern Bay portion. To illustrate the variability of erosion loss rates estimated between 1845 and 1942, the Cecil-Somerset County shoreline losses were estimated to be 0.13 acres/mile/year, while Dorchester County losses were estimated to be of the order of 0.64 acres/mile/year. It must be emphasized that land area losses do not indicate volumes of material handled, because of the differential in land elevation of various areas of Bay frontage.

The present and anticipated future social and economic development of the Chesapeake Bay Basin, with the estimated large increase in population, emphasizes the vulnerability of the Bay's sensitive estuarine system to the future works of man. In particular, the waste discharges of man's commerce and activity have a growing impact on the Bay. These waste loads are derived from municipal, industrial and agricultural sources.

Agricultural pollutants consist primarily of silt, fertilizer, insecticides, herbicides, and animal wastes. Industrial wastes contain a wide assortment of detrimental material ranging from sand and gravel wastes and heavy metals through complex chemical compounds and mine waste. Many of the latter waste types are toxic to both aquatic biota and man. Municipal discharges contain human wastes and a huge panorama of household and industrial by-products, and often inject significant bacterial loads into the aquatic environment, infecting both finfish and shellfish, making them potentially dangerous and therefore unfit for human consumption.

Gross estimates indicate that pollution affects some 400,000 acres of finfish habitat and 42,000 acres of shellfish habitat in Chesapeake Bay. Municipal and domestic discharges cause the major pollution problem.

There are other significant threats to the Chesapeake Bay environment. These include both inter- and intra-basin diversions

of freshwater. The determination of the effects of upstream management of the fresh water resource on the marine environment have only recently become of concern to oceanographers and marine biologists. Current examples of this problem in Chesapeake Bay are (1) the deepening of the Chesapeake and Delaware Canal, which will increase the net amount of water flowing from the head of Chesapeake Bay into Delaware Bay from about 900 cubic feet per second to about 2100 cubic feet per second, and (2) the Baltimore Water Supply Tunnel which taps the Susquehanna River above Conowingo Dam. Fresh water diversions can alter the salinity regime of the headwaters of the Bay, affecting the spawning opportunity of many species of fish. Further study of these problems will undoubtedly reveal presently unknown ecological ramifications of the estuary's struggle to reach and maintain suitable equilibrium in the wake of the incursions of man (Corps, 1970).

References:

The Corps of Engineers. 1970. The Chesapeake Bay Plan of Study. Baltimore District, Baltimore, Maryland.

Forest Service and Soil Conservation Service. 1972. North Atlantic Regional Water Resources Study, Land Use and Management. U. S. Department of Agriculture, Washington, D. C.

Jenkins, D. W. 1971. Agriculture and Forestry. Identification, Vigor and Disease. Article from Remote Sensing of Chesapeake Bay, National Aeronautics and Space Administration, Washington, D. C. NASA SP-294.

McHarg, Ian. 1972. Integrity of the Chesapeake Bay. Urban Research and Development Corporation, Bethlehem, Pa.

Saila, Saul B. 1973. Coastal and Offshore Environmental Inventory. University of Rhode Island, Kingston, Rhode Island, Marine Publication Series #2.

Shands, W. E. and Mathes, Ruth. 1972. The Future of Chesapeake Bay. Sierra Club Bulletin, Vol. 57, No. 4.

State of Maryland. 1968. Proceedings of the Governors Conference on Chesapeake Bay. Westinghouse Ocean Research and Engineering Center, Annapolis, Maryland.

U. S. Department of the Interior, Fish and Wildlife Service. 1970. National Estuary Study, vol. 3. U. S. Government Printing Office, Washington, D. C.

Wass, Marvin L. and Wright, Thomas D. 1969. Coastal Wetlands of Virginia. Virginia Institute of Marine Science, Gloucester Point, Virginia.

APPENDIX B

BIOTIC COMMUNITIES OF THE CHESAPEAKE BAY REGION

by

Gary S. Waggoner
Ecologist

Center for Natural Areas
Ecology Program
Smithsonian Institution

June, 1973

BIOTIC COMMUNITIES OF THE CHESAPEAKE BAY¹INTRODUCTION

This report presents a summary of the characteristic biota and biotic communities of the Chesapeake Bay region, defined in terms of typical vegetation, associated animal species, and critical environmental factors. The plant species listed are the dominant or characteristic species typical of the various biotic communities. The animal species lists are more extensive and include the common and/or characteristic species associated with each biotic community.

The ecology of the Chesapeake Bay region has been influenced strongly by the presence of civilized man. But even before the colonists had set foot on the continent, Indians had made their presence known. Fire was an often used tool of the Indians for hunting purposes and clearing land.

Following colonization by white men, more intensive land clearing occurred during the eighteenth and early part of the nineteenth centuries. Lumber was needed for shelter and firewood and the settlers brought their European agricultural system with them. Virgin land was so plentiful that a shifting form of agriculture with little care for the soil became prevalent. Tobacco depleted much of the soil of its nutrients and when fields were abandoned, erosion quickly exhausted the topsoil. At the time of the Civil War, labor became scarce and much of the previously cultivated land was abandoned. These abandoned fields were invaded by loblolly pine Pinus taeda, pitch pine Pinus rigida and scrub pine Pinus virginiana. These species are typical pioneer tree species in old field or secondary succession.

Pine forests, although common, are not the climax vegetation but are dominant due to a history of disturbances including fire, agriculture and lumbering. Braun (1950) indicates

1 The information for this appendix has been taken from a report by the author on the "Atlantic Coastal Plain Natural Region Survey" written for a contract with the National Park Service's Natural Landmarks Program. This report was edited by the principal investigator and author by extracting those portions relevant to the Chesapeake Bay region. This report has certain shortcomings primarily relating to the difference in scope of the two reports; the larger Atlantic Coastal Plain region versus the more circumscribed Chesapeake Bay region.

that the Chesapeake Bay region should actually be considered an Eastern Oak-Hickory Forest region due to the dominance of oaks Quercus spp. and hickories Carya spp. in the climax communities.

The following is a breakdown of the major plant community types occurring in the Chesapeake Bay region with an indication of some of the critical environmental factors (limiting factors) controlling the community. After each description of a plant community type, some of the typical animal species associated with it are listed.

Aquatic Ecosystems

The northern portion of the Atlantic Coastal Plain is characterized by drowned river valleys, the best example of which is the Chesapeake Bay. The Chesapeake Bay is a unique estuary comprised of the drowned Susquehanna River Valley and several of its tributaries. The bay is unique because of its size and isolation from the Atlantic Ocean.

Salt Marsh

The salt marsh community is here divided into two different phases, the regularly flooded phase, and the irregularly flooded phase. Salt marsh develops in the low areas where inundation by salt water is frequent enough to prevent the survival of non-salt-tolerant species. The vegetation is dominated by various grasses and sedges. Woody species occur only on the higher ridges in this community.

The regularly flooded salt marshes occur along the open ocean and in the shallow sounds behind barrier islands. They are inundated twice daily to a depth of six inches or more by the highly saline waters of normal high tides. The flushing action of the tides is essential to this salt marsh community. It brings in certain nutrients from the surrounding estuary and flushes out toxic waste materials. Tidal creeks meander through the salt marsh and are rich in silt and organic debris from inland runoff. This provides additional nutrient supply to the surrounding marshes.

The regularly flooded salt marshes are generally dominated by saltmarsh cordgrass Spartina alterniflora. Saltmeadow cordgrass Spartina patens, salt grass Distichlis spicata, black needlerush Juncus roemerianus and glasswort Salicornia spp. are usually abundant. Along the more elevated ridges of the marsh, groundsel Baccharis halimifolia, marsh elder Iva frutescens, sea oxeye Borrichia frutescens, and sea lavender Limonium spp. occur.

The variations in drainage and salinity account for rather distinct plant zonation and distribution.

Irregularly flooded salt marshes occur along the shores of bays, sounds, and rivers. They are flooded only irregularly by wind and storm tides with from a few inches to several feet of water. Tidal creeks also dissect the irregularly flooded salt marshes but are typically shorter and straighter than those of the regularly flooded salt marshes. The water in these tidal creeks generally is less rich in organic debris and silt.

The vegetation is largely dominated by black needlerush Juncus roemerianus with saltmeadow cordgrass Spartina patens, salt grass Distichlis spicata, glasswort Salicornia spp. and saltmarsh three-square Scirpus robustus occurring as common associates. On ridges of high ground, marsh elder Iva frutescens and groundsel Bacharis halimifolia are common. Switchgrass Panicum virgatum may occur over large areas adjacent to the upland along with sea lavender Limonium spp. and sea oxeye Borrichia frutescens.

Typical animals include:

- Horseshoe crab Limulus polyphemus
- Fiddler crabs Uca spp.
- Marsh crab Sesarma reticulatum
- Saltmarsh snail Melampus bidentatus
- Periwinkle snail Littorina irrorata
- Ribbed mussel Volsella demissa
- Stinkpot Sternotherus odoratus
- Diamondback terrapin Malaclemys terrapin
- Water snake Natrix sipedon
- Eastern hognose snake Heterodon platyrhinos
- Canada goose Branta canadensis
- Snow goose Chen hyperborea
- Mallard Anas platyrhynchos
- Black duck Anas rubripes
- Pintail Anas acuta
- Blue winged teal Anas discors
- American widgeon Mareca americana
- Shoveler Spatula clypeata
- Herons
- Egrets
- Marsh hawk Circus cyaneus
- Sparrow hawk Falco sparverius
- Clapper rail Rallus longirostris
- Short eared owl Asio flammeus
- Sharp tailed sparrow Ammospiza caudacuta
- Seaside sparrow Ammospiza maritima

Opossum Didelphis marsupialis
 Least Shrew Cryptotis parva
 Least cottontail Sylvilagus floridanus
 Rice rat Oryzomys palustris
 Meadow vole Microtus pennsylvanicus
 Muskrat Ondatra zibethicus
 Raccoon Procyon lotor
 Mink Mustela vison
 River otter Lutra canadensis
 White tailed deer Odocoileus virginianus

Critical environmental factors in the salt marsh include salinity, frequency of inundation, and nutrient input and flushing action of the tides.

Brackish Marsh

The brackish marsh community develops in the transition zone between freshwater and salt marshes. Brackish marshes are located along bays and coastal rivers and are irregularly inundated by high winds and storms.

Several different plant associations are characteristic of this major community type. A short form of saltmarsh cordgrass Spartina alterniflora usually dominates the well drained areas. In the more poorly drained depressions, Olney's three-square Scirpus olneyi dominates with salt grass Distichlis spicata and black needlerush Juncus roemerianus occurring more abundantly along the better drained edges of such depressions. The taller form of salt-marsh cordgrass Spartina alterniflora may be found in abundance adjacent to tidal creeks, while saltmeadow cordgrass Spartina patens dominates in well drained soils adjacent to pond and creek borders. In the more elevated and drier areas, groundsel Baccharis halimifolia and marsh elder Iva frutescens are common. Other important plants in brackish marshes include widgeongrass Ruppia maritima,triplex Atriplex patula, sea lavender Limonium carolinianum, seashore mallow Kosteletskya virginica and glasswort Salicornia spp.

Typical animals include:

Mud crabs Xanthidae
 Blue crab Callinectes sapidus
 Saltmarsh snail Melampus bidentatus
 Periwinkle snail Littorina irrorata
 Canada goose Branta canadensis
 Mallard Anas platyrhynchos
 Black duck Anas rubripes

Pintail Anas acuta
 Blue winged teal Anas discors
 Green winged teal Anas carolinensis
 Gadwall Anas strepera
 American widgeon Mareca americana
 Shoveler Spatula clypeata
 Hooded merganser Lophodytes cucullatus
 Osprey Pandion haliaetus
 King rail Rallus elegans
 Short eared owl Asio flammeus
 Opossum Didelphis marsupialis
 Least shrew Cryptotis parva
 Eastern cottontail Sylvilagus floridanus
 Rice rat Oryzomys palustris
 Meadow vole Microtus pennsylvanicus
 Muskrat Ondatra zibethicus
 Raccoon Procyon lotor
 Mink Mustela vison
 River otter Lutra canadensis
 White tailed deer Odocoileus virginianus

Critical environmental factors include amount of salinity, frequency of inundation, and depth of water.

Freshwater Marsh

As with the salt marsh community, the freshwater community is divided into two phases, the coastal freshwater marsh phase and the inland freshwater marsh phase. The primary source of water for these marshes is precipitation and runoff via rivers and streams and thus a totally different type of community develops.

The coastal freshwater marsh phase occurs along rivers and streams where there is little or no tidal action as well as in interdunal areas. The water is fresh or slightly brackish and ranges in depth from ground level to several feet. A great diversity of plants is distributed in these marshes in response to variation in depth of water and salinity.

In areas where water is usually fresh, plants such as cattail Typha spp., wildrice Zizania aquatica, sawgrass Cladium spp. pickerelweed Pontederia cordata, and waterlily Nymphaea odorata may form extensive stands. In the more brackish areas, species characteristic of the more saline environments occur including tall cordgrass Spartina cynosuroides and Olney's threesquare Scirpus olneyi. Other typical species of the coastal freshwater marsh are smartweeds Polygonum spp., spikerushes Eleocharis spp., sedges

Carex spp., phragmites Phragmites communis, arrowhead Sagittaria spp., bulrushes Scirpus spp., pondweeds Potamogeton spp., button-bush Cephalanthus occidentalis, jewelweeds Impatiens spp. and alders Alnus spp.

The inland freshwater marsh phase is characterized by many of the same species but forms in shallow lake basins, limestone sinks sloughs, or at the borders of open water. The soil is waterlogged and may be covered by three feet or more of freshwater. Cattails, pondweeds, bulrushes, arrowheads, smartweeds, sedges and water lilies again are very important constituents of the marsh. However, in the inland marshes, grasses Poaceae, rushes Juncus spp., watermilfoils Myriophyllum spp., duckweeds Lemna spp., and spatterdock Nuphar luteum occur, often in great abundance, choking off open water areas.

Corresponding with the high diversity of plant species is a high diversity of animal species.

Typical animals include:

- Spotted salamander Ambystoma maculatum
- Tiger salamander Ambystoma tigrinum
- Spotted newt Notophthalmus viridescens
- Fowler's toad Bufo woodhousei fowleri
- American toad Bufo americanus
- Tree frogs Hyla spp.
- Chorus frogs Pseudacris spp.
- Cricket frog Acris gryllus
- Leopard frog Rana pipiens
- Bull frog Rana catesbeiana
- Green frog Rana clamitans
- Snapping turtle Chelydra serpentina
- Eastern mud turtle Kinosternon subrubrum
- Stinkpot turtle Sternotherus odoratus
- Spotted turtle Clemmys guttata
- Bog turtle Clemmys muhlenbergi
- Painted turtle Chrysemys picta
- Water snake Natrix sipedon
- Eastern ribbon snake Thamnophis sauritus
- Great blue heron Ardea herodias
- Mallard Anas platyrhynchos
- Southern bald eagle Haliaeetus leucocephalus leucocephalus
- Marsh hawk Circus cyaneus
- Osprey Pandion haliaetus
- King rail Rallus elegans
- Sora Porzana carolina

Common gallinule Gallinula chloropus
 Coot Fulica americana
 Short eared owl Asio flammeus
 Belted kingfisher Megaceryle alcyon
 Tree swallow Iridoprocne bicolor
 Long billed marsh wren Telmatodytes palustris
 Yellowthroat Geothlypis trichas
 Red winged blackbird Agelaius phoeniceus
 Meadowlark Sturnella magna
 Song sparrow Melospiza melodia
 Swamp sparrow Melospiza georgiana
 Opossum Didelphis marsupialis
 Masked shrew Sorex cinereus
 Star nosed mole Condylura cristata
 Eastern cottontail Sylvilagus floridanus
 Beaver Castor canadensis
 Rice rat Oryzomys palustris
 Meadow vole Microtus pennsylvanicus
 Muskrat Ondatra zibethicus
 Red fox Vulpes fulva
 Gray fox Urocyon cinereoargenteus
 Raccoon Procyon lotor
 Mink Mustela vison
 Striped skunk Mephitis mephitis
 River otter Lutra canadensis
 White tailed deer Odocoileus virginianus

Critical environmental factors in the freshwater marsh include depth of water, salinity, rate of siltation, turbidity of the water and competition for light and space.

Bog

Bog communities are divided into two different phases, sphagnum bogs and cedar swamps. All bogs have several features in common. They generally develop in areas where drainage is restricted, all have a surface layer of cushion-like vegetation, and all have an accumulation of peat. The decidedly acid condition of bogs limits the species which can persist here.

Sphagnum bogs are more typical of the mountain region and the far north, however, particularly in the northern section of the Atlantic Coastal Plain, they occur scattered across the landscape. Very few sphagnum bogs have persisted in the Chesapeake Bay region. The vegetation is generally low to the ground with the exception of some scattered shrubs and trees. Two mosses Sphagnum and Hypnum dominate the bog by creating a covering over the entire surface. Other species scattered through the bog include buckbean Menyanthes trifoliata, cotton grass Eriophorum spp., numerous sedges Carex spp., cranberry Vaccinium macrocarpon, sweet gale Myrica gale, bog

rosemary Andromeda glaucocephala, leatherleaf Chamaedaphne calyculata and Labrador tea Ledum groenlandicum. Insectivorous plants including pitcher plants Sarracenia purpurea, sundews Drosera spp. and bladderworts Utricularia spp. also occur in this rather unique community (Smith, 1966).

Cedar swamps are bogs dominated by dense, generally even-aged stands of Atlantic Coastal Plain from New Jersey north. While sphagnum bogs are usually small, cedar swamps may be extensive as in sections of the Pocomoke River swamp. Pitch pine Pinus rigida is widely scattered while red maple Acer rubrum, black gum Nyssa sylvatica, and sweet bay Magnolia virginiana form a dense understory. Other typical shrub species include highbush blueberry Vaccinium corymbosum, fetterbush Leucothoe spp. clammy azalea Rhododendron viscosum and bayberry Myrica pensylvanica. The herbaceous ground cover includes chain fern Woodwardia virginica, bladderworts Utricularia spp., pitcher plant Sarracenia purpurea, swamp pink Calopogon pulchellus, and partridgeberry Mitchella repens which are generally rather common.

Typical animals include:

- Bull frog Rana catesbeiana
- Green frog Rana clamitans
- Carpenter frog Rana virgatipes
- Bog turtle Clemmys muhlenbergi
- Water snake Natrix sipedon
- Bobwhite quail Colinus virginianus
- Turkey Meleagris gallopava
- Woodcock Rhilohela minor
- Mourning dove Zenaidura macroura
- Eastern wood pewee Contopus virens
- Wood thrush Hylocichla mustelina
- Parula warbler Parula americana
- Hooded warbler Wilsonia citrina
- Opossum Didelphis marsupialis
- Masked shrew Sorex cinereus
- Star nosed mole Condylura cristata
- Eastern cottontail Sylvilagus floridanus
- Beaver Castor canadensis
- Red-backed vole Clethrionomys gapperi
- Meadow vole Microtus pennsylvanicus
- Muskrat Ondatra zibethicus
- Red fox Vulpes fulva
- Gray fox Urocyon cinereoargenteus

Black bear *Ursus americanus*
 Raccoon *Procyon lotor*
 Mink *Mustela vison*
 River otter *Lutra canadensis*
 White tailed deer *Odocoileus virginianus*

Critical environmental factors in this community include frequency and severity of fire, duration of flooding and amount of peat or elevation.

Cypress-Gum Swamp Forest

The cypress-gum swamp forest is probably the most characteristic community of the South. It reaches its northern distribution in the Chesapeake Bay region occurring in several isolated areas such as Battle Creek Cypress swamp. In deeper swamps where the land is flooded almost continuously, baldcypress *Taxodium distichum* and/or water tupelo *Nyssa aquatica* will exist without associates, although water tupelo is much less tolerant of flooding than is baldcypress (Penfound, 1952). This community represents some of the wildest country remaining in the Atlantic Coastal Plain. Several of the larger predators persist in these swamps.

Typical animals include:

Pine woods tree frog *Hyla femoralis*
 Green tree frog *Hyla cinerea*
 Bull frog *Rana catesbeiana*
 Snapping turtle *Chelydra serpentina*
 Eastern mud turtle *Kinosternon subrubrum*
 Stinkpot *Sternothera odoratus*
 Spotted turtle *Clemmys guttata*
 Painted turtle *Chrysemys picta*
 Water snake *Natrix sipedon*
 Eastern hognose snake *Heterodon platyrhinos*
 Double crested cormorant *Phalacrocorax auritus*
 Common egret *Casmerodius albus*
 Black crowned night heron *Nycticorax nycticorax*
 Wood duck *Aix sponsa*
 Red shouldered hawk *Buteo lineatus*
 Woodcock *Philohela minor*
 Barred owl *Strix varia*
 Pileated woodpecker *Hylatomus pileatus*
 Acadian flycatcher *Empidonax virescens*
 Prothonotary warbler *Protonotaria citrea*
 Cardinal *Richmondena cardinalis*
 Opossum *Didelphis marsupialis*

Eastern cottontail Sylvilagus floridanus
 Gray squirrel Sciurus carolinensis
 Flying squirrel Glaucomys volans
 Beaver Castor canadensis
 Gray fox Urocyon cinereoargenteus
 Black bear Ursus americanus
 Raccoon Procyon lotor
 Mink Mustela vison
 River otter Lutra canadensis
 Bobcat Lynx rufus
 White tailed deer Odocoileus virginianus

Critical environmental factors include depth of water, duration of flooded condition, amount of peat developed, and occurrence of fire.

Land Ecosystems

Dune Community

This major community type fringes the Atlantic Ocean encompassing the frontal dune complex which extends from the ocean side base of the foredune, inland through the often closely spaced, smaller, hummocky dunes.

The community is usually dominated by perennial grasses with an occasional shrub or wind-sheared tree in protected areas. All of the species which persist here must have a certain degree of physiological salt tolerance to both salt spray and substrate salinity. They also must be able to withstand high winds and sand blasts, possess drought resistance, and be able to tolerate low levels of certain nutrients such as nitrogen. Physiologically, this is perhaps the harshest environment in the Atlantic Coastal Plain.

Due to this harsh environment, the vegetation is sparse with sea rocket Cakile spp., pigweed Amaranthus pumila and saltwort Salsola kali occurring on the beach and several grasses dominating on the dunes. American beachgrass Ammophila breviligulata, salt-meadow cordgrass Spartina patens, silver bunchgrass Panicum amarulum and running beachgrass Panicum amarum are the dominant grasses in the dune community. Herbaceous species gaining importance behind the foredune include beach pea Strophostyles helvola, sandbur Cenchrus tribuloides, seaside spurge Euphorbia polygonifolia and various broomsedges Andropogon spp..

Typical animals include:

Horseshoe crab Limulus polyphemus
 Ghost crab
 Coquina clam

Six lined racerunner Cnemidophorus sexlineatus
 Eastern hognose snake Heterodon platyrhinos
 Black racer Coluber constrictor
 Black rat snake Elaphe obsoleta
 Sparrow hawk Falco sparverius
 Plovers Charadrius spp. and Squatarola squatarola
 Turnstone Arenaria interpres
 Willet Catoptrophorus semipalmatus
 Sanderling Crocethia alba
 Gulls Larus spp.
 Terns Sterna spp.
 Horned lark Eremophilia alpestris
 Savanna sparrow Passerculus sandwichensis
 Ipswich sparrow Passerculus princeps
 Eastern cottontail Sylvilagus floridanus
 White footed mouse Peromyscus leucopus
 House mouse Mus musculus
 Meadow jumping mouse Zapus hudsonius

The critical environmental factors in this community include high salinity (salt spray and substrate salinity), drought conditions (due to sandy soils, high winds, and high solar radiation), and low nutrient availability.

Maritime Shrub Thicket

This community occupies the area behind the dune community and is characterized by a dense growth of low shrubs, often tangled with numerous lianas. Usually the closed cover of the shrub thicket begins abruptly, with the shrubs massed on the ocean side of old dunes. The first shrubs are commonly prostrate and become progressively taller inland. The tops of these shrubs are closely sheared by wind-borne salt spray and form a smooth, compact surface gradually increasing in height inland.

The dominant plants in this community include common wax myrtle Myrica cerifera, groundsel Baccharis halimifolia, shining sumac Rhus copallina redcedar Juniperus virginiana and marsh elder Iva frutescens. Important vines include Virginia creeper Parthenocissus quinquefolia, poison ivy Rhus radicans, green briar Smilax spp. and wild grape Vitis spp. Bayberry Myrica pensylvanica, as well as highbush blueberry Vaccinium corymbosum are important shrub species (Higgins et. al., 1971.)

Typical animals include:

Toads Bufo spp.
 Tree frogs Hyla spp.
 Six lined racerunner Cnemidophorus sexlineatus

Eastern hognose snake Heterodon platyrhinos
 Black racer Coluber constrictor
 Yellow shafted flicker Colaptes auratus
 Mockingbird Mimus polyglottus
 Prairie warbler Dendroica discolor
 Red winged blackbird Agelaius phoeniceus
 Boat tailed grackle Cassidix mexicanus
 Meadowlark Sturnella magna
 Towhee Pipilo erythrophthalmus
 Opossum Didelphis marsupialis
 Eastern cottontail Sylvilagus floridanus
 White footed mouse Peromyscus leucopus
 Meadow jumping mouse Zapus hudsonius
 Gray fox Urocyon cinereoargenteus
 Raccoon Procyon lotor
 Mink Mustela vison

The critical environmental factors in this community are basically the same as those of the dune community, however, they are less severe due to the protection afforded by the foredune complex.

Maritime Forest

This community type develops immediately behind the maritime shrub thicket community and consists of closely spaced trees. It occurs on the mainland and/or on offshore islands and barrier beaches. Although protected to some extent by large dunes and maritime shrub thicket, it is strongly influenced by salt spray blown in from the Atlantic Ocean (Wells, 1939; Boyce, 1954).

The community is dominated by redcedar Juniperus virginiana, holly Ilex opaca, bear oak Quercus ilicifolia and pitch pine Pinus rigida. (Harshberger, 1900).

Maritime forest normally develops on old dune systems and interdunal freshwater marshes and ponds are common. The presence of this freshwater supply allows for large populations of wildlife, many species not normally associated with forest communities.

Typical animals include:

Snapping turtle Chelydra serpentina
 Eastern mud turtle Kinosternon subrubrum
 Spotted turtle Clemmys guttata
 Ground skink Lygosoma laterale
 Five lined skink Eumeces fasciatus
 Water snake Natrix sipedon
 Eastern hognose snake Heterodon platyrhinos

Black racer Coluber constrictor
 Black rat snake Elaphe obsoleta
 Diamondback rattlesnake Crotalus adamanteus
 Sharp shinned hawk Accipiter striatus velox
 Red shouldered hawk Buteo lineatus
 Red tailed hawk Buteo jamaicensis
 Whip poor will Caprimulgus vociferus
 Crested flycatcher Myiarchus crinitus
 Carolina wren Thryothorus ludovicianus
 White eyed vireo Vireo griseus
 Red eyed vireo Vireo olivaceus
 Parula warbler Parula americana
 Yellow throated warbler Dendroica dominica
 Pine warbler Dendroica pinus
 Cardinal Richmondena cardinalis
 Opossum Didelphis marsupialis
 Gray squirrel Sciurus carolinensis
 White footed mouse Peromyscus leucopus
 Gray fox Urocyon cinereoargenteus
 Raccoon Procyon lotor
 Mink Mustela vison
 White tailed deer Odocoileus virginianus

The critical environmental factors controlling this community are basically the same as those of the previous two communities, namely, high salinity, drought conditions, and low nutrient availability. However, this community has much less severe conditions than the previous communities discussed.

Pine Flatwoods

In the northern portion of the Atlantic Coastal Plain loblolly pine Pinus taeda, and pitch pine Pinus rigida become the dominants of the coastal flatwoods. Loblolly pine is particularly important in Virginia while pitch pine dominates in Maryland. The pine flatwoods are generally rather open with an incomplete canopy but often have a diverse shrub and herb zone.

Typical animals include:

Eastern spadefoot Scaphiopus holbrookii
 Pine woods tree frog Hyla femoralis
 Green tree frog Hyla cinerea
 Box turtle Terrapene carolina
 Fence lizard Sceloporus undulatus
 Six lined racerunner Cnemidophorus sexlineatus
 Ground skink Lygosoma laterale
 Five lined skink Eumeces fasciatus
 Cornsnake Elaphe guttata

Diamondback rattlesnake Crotalus adamanteus
 Red tailed hawk Buteo jamaicensis
 Broad winged hawk Buteo platypterus
 Bobwhite quail Colinus virginianus
 Mourning dove Zenaidura macroura
 Great horned owl Bubo virginianus
 Yellow shafted flicker Colaptes auratus
 Hairy woodpecker Dendrocopos villosus
 Downy woodpecker Dendrocopos pubescens
 Red cockaded woodpecker Dendrocopos borealis
 Brown headed nuthatch Sitta pusilla
 Eastern bluebird Sialia sialis
 Yellow throated warbler Dendroica dominica
 Pine warbler Dendroica dominica
 Pine warbler Dendroica pinus
 Prairie warbler Dendroica discolor
 Meadowlark Sturnella magna
 Towhee Pipilo erythrophthalmus
 Pine woods sparrow Aimophila aestivalis
 Opossum Didelphis marsupialis
 Eastern cottontail Sylvilagus floridanus
 Pine mouse Pitymys pinetorum
 Gray fox Urocyon cinereoargenteus
 Raccoon Procyon lotor
 Bobcat Lynx rufus
 White tailed deer Odocoileus virginianus

Critical environmental factors governing the composition of this community include frequency of fire, drainage, and lack of local relief.

Bottomland Hardwood Forest

This community type is one of the most diverse terrestrial plant communities in the Atlantic Coastal Plain and is again, best developed in the southern section of that province. It occupies the floodplains of the major rivers, and is closely associated with the cypress-gum swamp forest.

Behind a natural levee, three types of minor relief occur, low ridges, flats, and sloughs. The presence of a clay pan restricts drainage behind the levee and the flats and sloughs are flooded for varying lengths of time. Cypress-gum swamp forest occupies the sloughs and flats which remain flooded for long periods. The low ridges, however, being a few feet above the normal flood level are inundated only occasionally. Bottomland hardwood forest develops on these ridges and on the higher flats. On older floodplain terraces or second bottoms, this forest community attains its best development (Putnam et. al., 1960).

Typically the most important trees are sweetgum Liquidambar styraciflua, white oak Quercus alba, swamp chestnut oak Quercus michauxii, laurel oak Quercus laurifolia, water oak Quercus nigra, willow oak Quercus phellos, overcup oak Quercus lyrata, pin oak Quercus palustris, Nuttall oak Quercus nuttalli, water ash Fraxinus caroliniana, winged elm Ulmus alata, American elm Ulmus americana, swamp tupelo Nyssa sylvatica var. biflora, red maple Acer rubrum, loblolly pine Pinus taeda and hackberry Celtis laevigata. Early successional stages, occurring close to the river, are dominated by cottonwood Populus deltoides and heterophylla and black willow Salix nigra.

Hotchkiss and Stewart (1947) indicate that beech Fagus grandifolia dominates in the mature bottomland hardwood forests of Maryland. On the smaller floodplains, especially in the northern section of the Atlantic Coastal Plain, river birch Betula nigra, sycamore Platanus occidentalis, box elder Acer negundo and silver maple Acer saccharinum dominate the stream sides.

The floodplain soils are quite rich due to the frequent addition of alluvium. Farmers have cleared much of the best drained bottomlands for cultivation and have reaped great benefits from this land. This, must be considered as a major threat to the survival of this forest as a community type.

Animal species are also quite abundant in this community due to the presence of a large supply of foods.

Typical animals include:

- Two lined salamander Eurycea bislineata
- Fowler's toad Bufo woodhousei fowleri
- Squirrel tree frog Hyla squirella
- Pine woods tree frog Hyla femoralis
- Green tree frog Hyla cinerea
- Bull frog Rana catesbeiana
- Box turtle Terrapene carolina
- Broad headed skink Eumeces laticeps
- Water snake Natrix sipedon
- Eastern hognose snake Heterodon platyrhinos
- Wood duck Aix sponsa
- Red shouldered hawk Buteo lineatus
- Bobwhite quail Colinus virginianus
- Turkey Meleagris gallopavo
- Woodcock Philohela minor
- Barred owl Strix varia

Pileated woodpecker *Hylatomus pileatus*
 Red headed woodpecker *Melanerpes erythrocephalus*
 Acadian flycatcher *Empidonax virescens*
 Prothonotary warbler *Protonotaria citrea*
 Cardinal *Richmondena cardinalis*
 Opossum *Didelphis marsupialis*
 Eastern cottontail *Sylvilagus floridanus*
 Gray squirrel *Sciurus carolinensis*
 Fox squirrel *Sciurus niger*
 Flying squirrel *Glaucomys volans*
 Beaver *Castor canadensis*
 Gray fox *Urocyon cinereoargenteus*
 Black bear *Ursus americanus*
 Raccoon *Procyon lotor*
 Mink *Mustela vison*
 River Otter *Lutra canadensis*
 Bobcat *Lynx rufus*
 White tailed deer *Odocoileus virginianus*

Critical environmental factors controlling the composition of this community include duration of flooding, elevation and drainage of soil, occurrence of fire and length of time covered with vegetation.

Upland Pine Forest

This community type is here divided into two phases, loblolly pine-shortleaf pine phase and pitch pine phase. The overall importance of this community in the uplands of the Atlantic Coastal Plain reflects the history of disturbance in this region. The community is successional in nature, being comprised of a canopy of pines *Pinus* spp. and an understory of hardwoods usually dominated by oaks *Quercus* spp.

The loblolly pine-shortleaf pine phase occupies the disturbed upland habitats and is definitely successional. It is generally associated with soils which possess more clay than the soils in the pine flatwoods which are generally quite sandy. Loblolly pine *Pinus taeda* in particular is the first tree species to invade abandoned lands. It may dominate the forest for more than 80 years before the climax hardwoods become dominant (Oosting, 1942). Shortleaf pine *Pinus echinata*, also a pioneer species, attains its best development in the drier habitats as on ridge tops. Except in the youngest stands, an understory of mixed hardwoods including white oak *Quercus alba*, scarlet oak *Quercus coccinea*, red oak *Quercus rubra*, black oak *Quercus velutina*, post oak *Quercus stellata*, southern red oak *Quercus falcata*, water oak *Quercus nigra*,

mockernut hickory Carya tomentosa, pignut hickory Carya glabra, black gum Nyssa sylvatica and sweetgum Liquidambar styraciflua occurs. Often the hickories appear late in succession. Scrub pine Pinus virginiana is also an important pioneer species, particularly in the northern portion of the Chesapeake Bay region.

The pitch pine phase dominates the disturbed uplands from Maryland north to Cape Cod along the Atlantic Coastal Plain. Associated with the pitch pine are blackjack oak Quercus marylandica, post oak Quercus stellata, black oak Quercus velutina and scarlet oak Quercus coccinea. The scrub oak Quercus ilicifolia is also a common associate on the drier sites. (McCormick, 1970).

Typical animals include:

Dusky salamander Desmognathus fuscus
 Red backed salamander Plethodon cinereus
 Slimy salamander Plethodon glutinosus
 Eastern spadefoot Scaphiopus holbrookii
 Fowler's toad Bufo woodhousei fowleri
 Box turtle Terrapene carolina
 Fence lizard Sceloporus undulatus
 Six lined racerunner Cnemidophorus sexlineatus
 Ground skink Lygosoma laterale
 Eastern garter snake Thamnophis sirtalis
 Eastern hognose snake Heterodon platyrhinos
 Black racer Coluber constrictor
 Eastern coachwhip Mastigophis flagellum
 Corn snake Elaphe guttata
 Black rat snake Elaphe obsoleta
 Pine snake Pituophis melanoleucus
 Copperhead Agristostrodon contortrix
 Timber rattlesnake Crotalus horridus
 Bobwhite quail Colinus virginianus
 Screech owl Otus asio
 Great horned owl Bubo virginianus
 Ruby throated hummingbird Archilochus colubris
 Eastern wood pewee Contopus virens
 Carolina chickadee Parus carolinensis
 Blue gray gnatcatcher Polioptila caerulea
 White eyed vireo Vireo griseus
 Pine warbler Dendroica pinus
 Summer tanager Piranga rubra
 Cardinal Richmondena cardinalis
 Field sparrow Spizella pusilla
 Opossum Didelphis marsupialis
 Masked shrew Sorex cinerea

Short tailed shrew Blarina brevicauda
 Common mole Scalopus aquaticus
 Eastern cottontail Sylvilagus floridanus
 Gray squirrel Sciurus carolinensis
 Fox squirrel Sciurus niger
 Red squirrel Tamiasciurus hudsonicus
 Flying squirrel Glaucomys volans
 White footed mouse Peromyscus leucopus
 Meadow vole Microtus pennsylvanicus
 Pine vole Pitymys pinetorum
 Gray fox Urocyon cinereoargenteus
 Raccoon Procyon lotor
 Bobcat Lynx rufus
 White tailed deer Odocoileus virginianus

Critical environmental factors determining the vegetational composition in this community include frequency of disturbance, water holding capacity of the soil, and frequency of fire.

Upland Hardwood Forest

This vegetational type is considered to be the climax vegetation in the upland regions of the Atlantic Coastal Plain. In fact however, it is not particularly common on the Coastal Plain due to the frequency of disturbance there. The upland hardwood forest is dominated by various species of oak Quercus.

The xeric or dry phase of this community type occurs primarily on the dry, sand ridges of the Coastal Plain. It is dominated by scrubby oaks which persist after the timbering or death of various pines, especially shortleaf pine Pinus echinata, scrub pine Pinus virginiana, and pitch pine Pinus rigida. On the more mesic sites, southern red oak Quercus falcata often dominates. Blackjack oak Quercus marylandica, post oak Quercus stellata and scrub oak Quercus ilicifolia are the characteristic species however, pine is usually always present due to the frequency of fire and/or other disturbances.

The intermediate phase of the upland hardwood forest is the most common representative of this community type. In the northern section of the Coastal Plain, the dominant species include black oak Quercus velutina, chestnut oak Quercus prinus, white oak Quercus alba and scarlet oak Quercus coccinea with blackgum Nyssa sylvatica, post oak Quercus stellata and several hickories Carya spp. also being common.

The rich or mesic phase occurs only on the best sites, such as moist ravines. The most indicative species of this community is the beech Fagus grandifolia. Quarterman and Keever (1962) termed this community (in southern Coastal Plain) the Southern Mixed Hardwood Forest. They identify 14 species which are very important and 10 taxa which are highly restricted to this community. The 14 species include beech Fagus grandifolia, white oak Quercus alba, sweetgum Liquidambar styraciflua, laurel oak Quercus laurifolia, southern magnolia Magnolia grandiflora, water oak Quercus nigra, mockernut hickory Carya tomentosa, pignut hickory Carya glabra, loblolly pine Pinus taeda, southern red oak Quercus falcata, blackgum Nyssa sylvatica, holly Ilex opaca, dogwood Cornus florida, and farkleberry Vaccinium arboreum.

Typical animals include:

Dusky salamander Desmognathus fuscus
 Red backed salamander Plethodon cinereus
 Slimy salamander Plethodon cinereus
 Two lined salamander Eurycea bislineata
 Fowler's toad Bufo woodhousei forleri
 Box turtle Terrapene carolina
 Ground skink Lygosoma laterale
 Broad headed skink Eumeces laticeps
 Eastern garter snake Thamnophis sirtalis
 Black racer Coluber constrictor
 Black rat snake Elaphe obsoleta
 Copperhead Agiistrodon contortrix
 Red shouldered hawk Buteo lineatus
 Red tailed hawk Buteo jamaicensis
 Broad winged hawk Buteo platypterus
 Bobwhite quail Colinus virginianus
 Turkey Meleagris gallopavo
 Screech owl Otus asio
 Great horned owl Bubo virginianus
 Ruby throated hummingbird Archilochus colubris
 Yellow shafted flicker Colaptes auratus
 Pileated woodpecker Hylatomus pileatus
 Red headed woodpecker Melanerpes erythrocephalus
 Hairy woodpecker Dendrocopus villosus
 Downy woodpecker Dendrocopus pubescens
 Acadian flycatcher Empidonax virescens
 Eastern wood pewee Contopus virens
 Crested flycatcher Myiarchus crinitus
 Common crow Corvus brachyrhynchos
 Blue jay Cyanocitta cristata
 Tufted titmouse Parus bicolor
 Carolina chickadee Parus carolinensis

White breasted nuthatch Sitta carolinensis
 Carolina wren Thryothorus ludovicianus
 Wood thrush Hylocichla mustelina
 Yellow throated vireo Vireo flavifrons
 Red eyed vireo Vireo olivaceus
 Black and white warbler Mniotilla varia
 Oven bird Seiurus aurocapillus
 Hooded warbler Wilsonia citrina
 Summer tanager Piranga rubra
 Cardinal Richmondena cardinalis
 Slate colored junco Junco hyemalis
 Opossum Didelphis marsupialis
 Masked shrew Sorex cinereus
 Short tailed shrew Blarina brevicauda
 Eastern cottontail Sylvilagus floridanus
 Eastern chipmunk Tamias striatus
 Gray squirrel Sciurus carolinensis
 Fox squirrel Sciurus niger
 Flying squirrel Glaucomys volans
 White footed mouse Peromyscus leucopus
 Pine vole Pitymys pinetorum
 Gray fox Urocyon cinereoargenteus
 Raccoon Procyon lotor
 Long tailed weasel Mustela frenata
 Striped skunk Mephitis mephitis
 White tailed deer Odocoileus virginianus

Critical environmental factors controlling the character of this community include water holding capacity of the soil, frequency of disturbance, and topography.

Old Field Community

This is a community type which occurs over the entire Atlantic Coastal Plain in almost all upland situations. The old field community develops on abandoned lands, particularly agricultural lands.

The vegetational composition of these old fields is largely dependent on the amount of time since abandonment. Immediately following abandonment weeds invade the land including crabgrass Digitaria sanguinalis and horseweed Erigeron canadensis. The first year after abandonment, old fields are totally dominated by horseweed. The next few years the old field community is dominated by white aster Aster pilosus. During this time, broomsedge Andropogon virginicus appears and begins to spread until it eventually dominates the old field community. During the broomsedge stage, young pines begin to appear in the fields and eventually as they grow their crowns meet and a closed canopy develops. Once this occurs the broomsedge will become

uncommon as it cannot survive under the dense shade produced by the closed canopy. As the pines grow the community type changes to a pine flatwoods or upland pine forest community and if there is little or no further disturbance upland hardwood forest becomes the climax vegetation. This sequence of changes is occurring throughout the Atlantic Coastal Plain and is called secondary succession or old field succession.

Typical animals of the early stages include:

Fowler's toad Bufo woodhousei fowleri
 American toad Bufo americanus
 Six lined racerunner Cnemidophorus sexlineatus
 Black racer Coluber constrictor
 Black rat snake Elaphe obsoleta
 Red shouldered hawk Buteo lineatus
 Red tailed hawk Buteo jamaicensis
 Marsh hawk Circus cyaneus
 Bobwhite quail Colinus virginianus
 Mourning dove Zenaidura macroura
 White eyed vireo Vireo griseus
 Prairie warbler Dendroica discolor
 Yellowthroat Geothlypis trichas
 Yellow breasted chat Icteria virens
 Meadowlark Sturnella magna
 Cardinal Richmondena cardinalis
 Towhee Pipilo erythrorthalmus
 Savanna sparrow Passerculus sandwichensis
 Grasshopper sparrow Ammodramus savannarum
 Bachman's sparrow Aimophila aestivalis bachmanii
 Field sparrow Spizella pusilla
 Opossum Didelphis marsupialis
 Short tailed shrew Blarina brevicauda
 Least shrew Cryptotis parva
 Common mole Scalopus aquaticus
 Eastern cottontail Sylvilagus floridanus
 White footed mouse Peromyscus leucopus
 Meadow jumping mouse Zapus hudsonius
 Housemouse Mus musculus
 Meadow vole Microtus pennsylvanicus
 Long tailed weasel Mustela frenata
 Striped skunk Mephitis mephitis
 Red fox Vulpes vulpes

Critical environmental factors determining its vegetational composition include length of time left abandoned, low soil water holding capacity, low soil nutrient status and frequency of disturbance. It has been shown that allelopathy or "Chemical warfare between plants" occurs in the early stages of succession (Keever, 1950) and thus this is a critical environmental factor.

REFERENCES

Bernard, J. M. and F. A. Bernard. 1971. Mature upland forests of Cape May County, New Jersey. Bull. Torrey Bot. Club 98(3):167-171.

Boyce, S. E. 1954. The salt spray community. Ecol. Monogr. 24(1):29-67.

Braun, E. L. 1950. Deciduous forests of eastern North America. Hafner Publishing Company, Inc., New York, p. 596.

Buell, M. F. and R. L. Cain. 1943. The successional role of Southern White Cedar, Chamaecyparis thyoides, in southeastern North Carolina. Ecol. 24(1):85-93.

Burt, W. H. and R. P. Grossenheider. 1964. A field guide to the mammals. Houghton Mifflin Company, Boston, p. 284.

Conant, R. 1958. A field guide to reptiles and amphibians, Houghton Mifflin Company, Boston, p. 366.

Fenneman, N. M. 1938. Physiography of eastern United States. McGraw Hill Publishing Company, New York, p. 714.

Gerlach, A. C. (ed). 1970. The national atlas of the United States of America. U. S. Government Printing Office., Washington, D. C. p. 417.

Golley, F. B. 1962. Mammals of Georgia. University of Georgia Press, Athens, Georgia, p. 218.

Hamilton, W. J. Jr. 1943. The mammals of eastern United States. Comstock Publishing Company, Ithaca, New York, p. 432.

Hammond, E. H. 1964. Classes of land surface form in the forty-eight states, U.S.A. Annals of the Assoc. of Amer. Geographers 54(1): map supplement no. 4.

Handley, C. O. Jr. and C. P. Patton. 1947. Wild mammals of Virginia. Commonwealth of Virginia, Comm. of Game and Inland Fisheries, Richmond, Virginia, p. 220.

Harshberger, J. W. 1900. An ecological study of the New Jersey strand flora. Proc. of the Acad. of Nat. Sciences of Phila. 52:623-671.

Higgins, E.A.T., R. D. Rappleye, and R. G. Brown. 1971. The flora and ecology of Assateague Island. Univ. of Maryland Agriculture Experiment Station Bull. No. A-172. Univ. of Maryland, College Park, Md. p. 70.

Hotchkiss, N. and R. E. Stewart. 1947. Vegetation of the Patuxent Research Refuge, Maryland. Amer. Midl. Nat. 38(1):1-75.

Keever, C. 1950. Causes of succession on old fields of the Piedmont, North Carolina. Ecol. Monogr. 20:229-250.

Kellogg, C. (ed.). 1957. Soil--The 1957 yearbook of agriculture. U. S. Government Printing Office, Washington, D. C. p. 784.

Laessle, A. M. 1958. The origin and successional relationships of sandhill vegetation and sand-pine scrub. Ecol. Monogr. 28(4):361-387.

McCormick, J. 1970. The pine barrens: A preliminary ecological inventory. New Jersey State Museum Report No. 2.

Monk, C. D. 1965. Southern mixed hardwood forest of northcentral Florida. Ecol. Monogr. 35:335-354.

Monk, C. D. 1968. Successional and environmental relationships of the forest vegetation of north central Florida. Amer. Midl. Nat. 79(2):441-457.

Monk, C. D. and T. W. Brown. 1965. Ecological considerations of cypress heads in northcentral Florida. Amer. Midl. Nat. 74(1):126-140.

Murray, G. E. 1961. Geology of the Atlantic and Gulf Coastal Province of North America. Harper and Brothers, New York, p. 692.

Oosting, H. J. 1942. An ecological analysis of the plant communities of Piedmont, North Carolina. Amer. Midl. Nat. 28(1):1-126.

Oosting, H. J. 1954. Ecological processes and vegetation of the maritime strand in the southeastern United States. Bot. Rev. 20(4):226-262.

Penfound, W. T. 1952. Southern swamps and marshes. Bot. Rev. 18(6):413-446.

Peterson, R. T. 1947. A field guide to the birds. Houghton Mifflin Company, Boston, p. 230.

Prouty, W. F. 1952. Carolina bays and their origin. Geol. Soc. Amer. Bull. 63:167-224.

Putnam, J. A., G. M. Furnival, and J. S. McKnight. 1960.
Management and inventory of southern hardwoods. Agriculture
Handbook No. 181. U. S. Government Printing Office,
Washington, D. C. p. 102.

Quarterman, E. and C. Keever. 1962. Southern mixed hardwood
forest: Climax in the southeastern Coastal Plain, U.S.A..
Ecol. Monogr. 32:167-185.

Shelford, V. E. 1963. The ecology of North America. Univ. of
Illinois Press, Urbana, Ill., p. 610.

Sirkin, L. A. 1972. Origin and history of Maple Bog in the
Sunken Forest, Fire Island, New York. Bull. Torrey Bot.
Club 99:131-135.

Smith, R. L. 1966. Ecology and field biology. Harper and Row,
Publishers, New York, p. 686.

Trewartha, G. T. 1954. An introduction to climate. McGraw-Hill
Book Company, Inc., New York, p. 402.

Wells, B. W. 1939. A new forest climax: The salt spray climax
of Smith Island. Bull. Torrey Bot. Club 66:629-634.

Wells, B. W. and I. V. Shunk. 1931. The vegetation and habitat
factors of the coarser sands of the North Carolina Coastal
Plain: An ecological study. Ecol. Monogr. 1:465-521.

APPENDIX C

RARE, ENDANGERED AND THREATENED VERTEBRATE SPECIES OF THE CHESAPEAKE BAY REGION

by

Anne LaBastille, Ph.D.

Center for Natural Areas

Ecology Program

Smithsonian Institution

April, 1973

RARE, ENDANGERED, AND THREATENED VERTEBRATE SPECIES IN THE CHESAPEAKE BAY REGION

INTRODUCTION

This report is part of a larger series of reports dealing with the Atlantic Coastal Plain and the Maine Coast as part of a coordinated effort to identify and analyze conservation priorities and selection of natural areas and landmarks along the east coast of the United States.

The Chesapeake Bay region, being one of the most outstanding because of its natural resource values and its proximity to large metropolitan complexes, was given special attention. This project was originated by The Nature Conservancy, in conjunction with the Chesapeake Bay Foundation, and was carried out by the Smithsonian Center for Natural Areas.

This report deals with rare, endangered, and threatened vertebrate animals occurring in the Chesapeake Bay area. Geographically the area is delineated by U. S. Highway 13 on the east, the North Carolina/Virginia state line to the south, the Fall Line or Interstate 95 on the west and north. This includes the Bay and its tributaries roughly to the limit of tidal influence.

A series of base maps has been developed by the Smithsonian Center for Natural Areas showing significant ecological data along the Atlantic Coastal Plain. A special set of maps of the Chesapeake Bay region indicates detailed zoological factors and sites where rare, endangered, or threatened fish and wildlife occur. Areas harboring such species have been given high rating among the conservation priorities in selecting natural areas for preservation.

SCOPE OF REPORT

The report summarizes existing and current information on rare, endangered, and threatened species of fish, amphibians, reptiles, birds, and mammals which occur in the Chesapeake Bay region. Included are species which are recognized on the U. S. Department of Interior's federal registry of endangered animals; and also species which are apparently experiencing rapid depletion in numbers and may be threatened. The data presented cover the status, estimated numbers, present distribution, reasons for decline, ecological values, and conservation measures taken or proposed for those species listed below. This information is presented in the same format as the U. S. Department of Interior's Redbook, "Threatened Wildlife of the United States", and the International Union for Conservation of Nature and Natural Resources (I.U.C.N.), Red Data Books.

METHODOLOGY

Data were assembled by contacting competent persons known to be experts on particular species or groups of species. Contact was made by personal interview, by telephone, and by a three-page questionnaire asking for detailed information on rare, endangered, or threatened species. This material was then compiled on the following data sheets.

The significant literature was reviewed, with emphasis placed on more recent papers and books (from 1960 to 1973). Since a time lag often exists between gathering of data and its publication, the most-up-to-date information was obtained through personal communication.

CLASSIFICATION OF SPECIES

There are not many rare, endangered, or threatened species of vertebrate animals in the Chesapeake Bay region. Those that occur there are dependent in part on the presence of natural and undisturbed habitats, and also on the broader aspect of uncontaminated environmental conditions. This is particularly important to birds of prey which are dependent on a long food chain, and where they may accumulate high levels of persistent chemicals. Chesapeake Bay is especially important as a nesting area for the endangered southern subspecies of the bald eagles and for ospreys. Both species reach relatively high concentrations in this area.

CLASSIFICATION OF RARE, ENDANGERED, AND THREATENED FISH AND WILDLIFE
SPECIES IN CHESAPEAKE BAY REGION

<u>Species Name</u>	<u>Rarity Classification</u>	
	<u>USDI</u>	<u>IUCN</u>
Delmarva Fox Squirrel	Endangered	1(b)R
Southern Bald Eagle	Endangered	2(b)P*
Osprey		Threatened (Amer.Birds, 1973)
Arctic Peregrine Falcon	Endangered	
Ipswich Sparrow	Rare	2(a)P*
Bog Turtle	Rare	2(a)
Sea Turtles:		
Green	Threatened	3(a)PT
Loggerhead		3(a)PT
Leatherback		
Hawksbill		1(a)PT
Atlantic Ridley		
Maryland Darter	Endangered	2(a)S Endangered (Miller, 1972)

Key to Classification on IUCN List:

- (a) = full species
- (b) = subspecies
- * = denotes species or subspecies critically endangered
- 1 = endangered
- 2 = rare
- 3 = depleted
- T = subject to substantial export trade
- P = legally protected, at least in some parts of its range
- S = secrecy still desirable

Reference to List:

American Birds, 1973 (in press). The Blue List for 1973: (an early warning system for birds).

I.U.C.N. 1971 (Rev.) Red Data Books, vol. 1-4: (Pisces, Amphibia and Reptiles, Aves, Mammalia) Morges 1110, Switzerland.

Miller, R. R. 1972. Threatened freshwater fishes of the United States. Trans. Amer. Fish. Soc., Vol. 101 (2):239-252.

U.S.D.I. 1973. Threatened Wildlife of the United States. Office of Endangered Species and International Activities, Bureau Sport Fisheries and Wildlife.

DELMARVA FOX SQUIRREL *Sciurus niger cinereus* (Linnaeus)
 or
 Bryants Fox Squirrel *Sciurus niger bryanti*
Sciurus niger neglectus (Gray)*

Order: RODENTIA

Family: SCIURIDAE

Estimated Numbers: About 500+ are known, and may be 1000+, but no total estimates are available. In 1964, Linduska estimated the population in the low thousands.

Present Distribution: These squirrels are found only in four Maryland counties, with certainty, plus one isolated record on the county line of Caroline/Talbot County. Introductions were made in one area at Chincoteague National Wildlife Refuge, Virginia. The main range is 50 to 75 miles x 25 miles. These are plotted in the map of zoological factors of ecological importance (Map 2).

Kent County - Eastern Neck Island and Eastern Neck National Wildlife Refuge, found in grain fields and woodlands and marsh on refuge, especially along Hickory Ridge. There is an estimate of 250+ squirrels (Refuge Manager, 1972). Possibly a few still occur on land owned by Eugene DuPont near Rock Hall, but no recent records.

Queen Anne County - On Wye Island about 75 acres of loblolly pine near Wye River with an estimate of several squirrels. Possibly also at Wye Mills; possibly also near Church Hill.

Talbot County - near Trappe along Choptank River (Walsh, 1973; Flyger, 1973); at head of Miles River (duPont McConnell, 1973); possibly around Bruceville, Windy Hill and Barber areas - the latter being along the LaTrappe River and creek with no name north of Choptank River (Walsh, 1973). Possibly at Little Neck and Island Creek Neck area (Walsh, 1973).

Dorchester County - Drawbridge area (Flyger, 1973); Walsh, 1973; also suggested from Presque Isle, Vienna, Ellicott and Steele Neck (Walsh, 1973) Linkwood State Wildlife Management Area has an area of 300 acres but few squirrels were estimated (Germany, 1972).

Blackwater National Wildlife Refuge - There are 11,300 acres with about 400 to 500 acres wooded and suitable for squirrel habitat with an estimate of 150+ squirrels (Julien and Germany, 1972).

The squirrels are usually found in ratio of one to three with Gray Squirrels (the latter predominating.) In one census 142 nests were counted, but this is ^a poor indicator since one squirrel or pair of squirrels may make more than one nest. On a 52 acre sample plot on the Refuge, 15 Delmarva Fox Squirrels were trapped and released (8 females, 7 males). An estimated 18 squirrels for the plot was calculated. Population density based on trap-recapture census study at Blackwater N.W.R. indicates that .37 Fox Squirrels occur per acre; or one squirrel needs about four acres of habitat, depending on mast crops. (Germany and Julien, 1972). It is also suggested that squirrels occur outside the Refuge in Kentuck and Greenbriar Swamps.

L'Compte State Wildlife Refuge contains 500 acres but few squirrels. Although this is supposedly a Fox Squirrel sanctuary, the area is not being managed for their benefit.

Piney Swamp, north of Blackwater River, has also been suggested as a squirrel habitat.

Caroline County - Only one record, but as mentioned above only a few squirrels were estimated.

Somerset County - It was suggested that Big Swamp next to an existing wildlife management plot may have some squirrels (Rivinus, 1972) but no proof exists.

Chincoteague National Wildlife Refuge: Delmarva Fox Squirrels are not known to exist here in the past, although they might have been within the overall range. Squirrels were introduced in March, 1968, 14 squirrels (7 females, 7 males), but several died. Another introduction made in January, 1971, of 23 squirrels, but 5 died. There are 600 acres of marginal to fair habitat between Sow Ponds, along ridge of White Hills, to Tom's Cove. This is a total area of 2.6 x .5 miles. A young squirrel was seen in January 1972 and in the fall of 1972, (Appel, 1972), (Julien and Germany, 1972). It is estimated that 4 to 5 years may be necessary to build up a viable population; however, squirrels are not doing well and may die out completely.

Note: Good stands of mature to old loblolly pine and also pine mixed with hardwoods are preferred by squirrels. Some large timber exists in private estates on the peninsulas west of Rt. 33 near St. Michaels and Royal Oak. Inquiry did not disclose whether squirrels have ever been seen here.

Status: Classified as endangered by U. S. Department of Interior. Considered to be threatened with extinction (Flyger, 1973). May be thought of as a threatened "island form" because of restricted range on Delmarva Peninsula. The populations are decreasing fairly rapidly.

Reasons for Decline:

1. Encroachment on habitat by real estate (vacation homes, etc.) and agriculture.
2. Heavy cutting of pine and hardwood stands during 1880's and again at present. State forestry policy encourages woodlot owners to cut their mature hardwood stands and plant quick-growing loblolly pine for marketing.
3. Fires destroy habitat.
4. Indiscriminate hunting and poaching, and occasional confusion by hunters between Delmarva Fox Squirrel and Eastern Grey Squirrel Sciurus carolinensis, because they have no knowledge of different characteristics. Also, juvenile Fox Squirrels may be mistaken for Grey Squirrels.

One pair of captive squirrels is being held at Remington Farms, Chestertown, Md., for breeding purposes. Squirrels have been held for 4 years and have not yet produced young. (Galbraith, 1973).

Protective Measures Taken:

1. Establishment of Blackwater and Eastern Neck National Wildlife Refuges; plus the L'Compote State Wildlife Management Area (1970) where squirrels find sanctuary and their habitat is protected.
2. State of Maryland banned hunting Delmarva Fox Squirrels in 1971 and imposed a \$50 fine for taking them.
3. Introduction to Chincoteague N.W.R. in 1968 and 1971 to provide a breeding nucleus on federally protected lands.
4. Research is being conducted at the University of Maryland by Dr. V. Flyger and Mr. G. Taylor.

Protective Measures Proposed:

1. Stop logging mature stands of loblolly Pinus taeda and hardwoods where good squirrel habitat exists. Another incentive might be offered for leaving land in woodland condition.

2. Acquire untouched areas of Kentuck and Greenbriar Swamps adjoining the Blackwater National Wildlife Refuge which contain good squirrel habitat and possibly squirrels. Also try to investigate and acquire habitat on LaTrappe Creek and Big Swamp. An attempt should be made to acquire, (if not too late) the Wye Mills or Wye Island land since this is proposed to be developed into five-acre housing lots.

3. L'Compte State Wildlife Management Area should be managed specifically for squirrels, not for other species of game.

4. Develop further research efforts into distribution, behavior, limiting factors, and optimum habitat conditions for the species.

5. Breed in captivity if possible so as to have extra stock; release into wild to restock good habitat.

6. Public education to help people differentiate between Grey and Fox Squirrels so that they will not hunt the wrong species, nor molest them in other ways.

Ecological Significance:

1. A beautiful and unique mammal.
2. Sport hunting, wildlife photography, nature viewing.
3. Serves as prey species for several forms of predators (owls, hawks, foxes, eagles, etc.)
4. Squirrels plant seeds of mast trees and help forest reproduction.
5. The enzyme defect in the heme biosynthetic pathway is the same in the Fox Squirrel Sciurus niger as in porphyric cattle and human beings. Therefore, members of this species can provide a small animal laboratory model for studies of congenital erythropoietic porphyria (a hereditary disease of humans and cattle) associated with a similar partial deficiency of uroporphyrinogen III cosynthetase (Levin and Flyger, 1971).

References: (Personal communication)

Dr. Vagn Flyger, Institute of Natural Resources, University of Maryland, College Park, Md.

Mr. Galbraith, Asst. Mg., Remington Farms, Chestertown, Md.

Mr. Bob Germany, Asst. Mgr., Blackwater National Wildlife Refuge, Cambridge, Md.

Mr. W. Julien, Refuge Mgr., Blackwater National Wildlife Refuge, Cambridge, Md.

Mrs. Jean duPont McConnell, (estate owner near St. Michaels), 120 120 Delaware Trust Bldg., Wilmington, Del., 19801.

Refuge Manager (former). Eastern Neck National Wildlife Refuge, Rock Hall, Md.

Rivinus, Edward F. Aug. 22, 1972, and Nov. 3, 1972. Office memo to Office of Environmental Sciences, Smithsonian Institution.

Gary Taylor, graduate student, Institute of Natural Resources, University of Maryland, College Park, Md.

Mr. Mike Walsh, game warden, Md. State Dept. Natural Resources, Talbot County, Md.

Literature:

Flyger, Vagn. 1964. Urban Sprawl endangers native Maryland mammals. Maryland Conservationist. 41(3):6-7.

Levin, E. Y. and V. Flyger. 1971. Uroporphyrinogen III cosynthetase activity in the Fox Squirrel Sciurus niger. Science 174:59-60.

Linduska, J. P. Apr. 9, 1964. in litt. Bureau of Sport Fisheries and Wildlife, Dept. of Interior, Washington, D. C.

Miller, G. S., Jr. and R. Kellogg. 1955. List of North American Recent Mammals. U. S. Natl. Museum. Bull. 205, Washington, D.C.

Paradise, J. L. 1969. Mammals of Maryland. North American Fauna 66: 193 pp.

Rhodes, L. 1971. Delmarva Peninsula Fox Squirrel study - first report for Blackwater National Wildlife Refuge. Unpublished report. 19 p.

SOUTHERN BALD EAGLE Haliaeetus leucocephalus leucocephalus

Order: FALCONIFORMES

Family: ACCIPITRIDAE

Estimated Numbers: The Chesapeake Bay region has had a population of about 65 pairs of eagles since the mid-1960's, following a 60 percent reduction in nesting pairs. (Abbott, 1971).

1972 - 40 breeding pairs (Natl. Audubon Soc., pers. comm. 1972).

1972 - 58 active nests; 20 young hatched; 1.3 young/successful nest; 32% hatching success of rechecked nests (Abbott, 1972).

1971 - 56 active nests; 26 young hatched; 1.2 young/successful nest; 35.7% hatching success of rechecked nests (Abbott, 1971).

1970 - 58 active nests; 22 young hatched; 1.3 young/successful nest; 32.6% hatching success of rechecked nests (Abbott, 1970).

1969 - 50 active nests; 29 young hatched; 1.5 young/successful nest; 38.8% hatching success of rechecked nests (Abbott, 1969).

1966 - 70 pairs (Natl. Audubon Soc., 1966).

1936 - 200 pairs of eagles; 250 active nests (Abbott, 1965); 1.8 young/successful nest (Sprunt, 1973).

Present Distribution:

See map 2, and reports at Smithsonian Institution with detailed locations of eagle nests (active and inactive) for Chesapeake Bay region (1970-1973), provided by Jackson Abbott. A total of 89 nest sites (not all active in one year): 4 in Delaware, 45 in Maryland; and 41 in Virginia. The region is the most productive area for Southern Bald Eagles north of Florida.

Mason's Neck National Wildlife Refuge - contains 904 acres of federal land with 4000 acres collectively protected by State and other lands on Mason Neck. The area has a year-round concentration of eagles, both winter and summer roosters, and a few nesters. Some artificial nest platforms have been installed for eagle use. There are usually 12 to 20 adult birds in the area. Recently up to 4 pairs nested; now only one pair, (Julien, 1972). No nests are on the N. W. Refuge, but one site close by on State land.

Assateague Island National Seashore - occasional sightings only (Norris, 1973).

Chincoteague National Wildlife Refuge - one or two seen each year; used to be fairly common as a wintering bird. None nesting now, (Appel, 1972).

Chincoteague National Wildlife Refuge - one or two seen each year; but they used to be fairly common as a wintering bird. None are nesting now. (Appel, 1972).

Blackwater N.W.R. - Has densest population of breeding eagles in Chesapeake Bay area. In 1972, 3 nests on Refuge lands; 1971, 7 nests on Refuge and adjacent lands, (Julien, 1972).

Status: Endangered - on U. S. Dept. of Interior federal list of endangered species. Seriously threatened and declining. A long-term trend downwards in numbers. A shift in location of nesting activities has accompanied the decline in numbers. Eagles have disappeared from upper parts of the tributaries and rivers and the upper part of the Bay. They now concentrate near river estuaries and in the lower part of the Bay. Pollutants here seem to be more diluted and dispersed due to the action of currents; therefore, the food supply is better, (Abbott, 1965, 1971).

Reasons for Decline:

1. Trauma, primarily from shooting, is one of the greatest, if not the greatest, cause of mortality among eagles, (Coon, et.al., 1970).
2. Concentrations of pesticides and their metabolites which are probably major factors causing decrease in Bald Eagle populations through egg-shell thinning from non-lethal amounts of DDE and other metabolites, or by direct mortality by lethal amounts, (see literature references on contamination).
3. Pollution of waterways (feeding areas) which limits fish (food supply) of eagles.

4. Removal of habitat and nest sites around the bay by farming, real estate development, encroachment of power transmission lines, and lumbering of tidewater forests.

5. Reproductive rate is below that considered necessary to maintain the population. A 50% fledgling rate is needed, or at least one fledged young per nest, for stable populations. In the Chesapeake Bay area, however, the fledgling rate is only 5 to 35% (Abbott, 1971). According to Sprunt (1969) and Sprunt et al. (1966), nesting success is only 15% here.

Protective Measures Taken:

1. Protection by federal law and fine of \$500 for killing an eagle. Laws to prohibit shooting.

2. Removal of bounty for eagles (which Alaska had for years).

3. Intensive investigations into pesticide and other chemical contamination of eagles and eagle eggs, their biology, distribution, behavior, etc. being carried out by Patuxent Wildlife Research Center, National Audubon Soc., State fish and game departments, etc. Investigations into artificial breeding programs.

4. Censuses are being made annually by Jackson Abbott, Fred Scott, Bureau of Sport Fisheries and Wildlife, and others to locate nest sites around Chesapeake Bay and determine activity, productivity, etc. Usually two airplane flights are made per breeding season.

5. Continued protection and acquisition of nest sites where not owned by federal or state conservation agencies to avoid destruction or disturbance to nesting eagles. In some cases, as in Maine and Florida, individual agreements are reached with private landowners to protect nest sites and birds.

6. Continued protection on federal and state refuges.

Protective Measures Proposed:

1. Acquisition of all known nest sites around Chesapeake Bay area as sanctuaries.

2. Continued research on, and control of, environmental contaminants, especially pesticides and PCB's which can effect eagle reproduction.

3. Increased public education and involvement in saving the species.

4. Continued research on eagle behavior and reproduction, plus emphasis on captive breeding programs.

5. Increased enforcement of eagle laws and increased punishment of offenders.

6. Water pollution abatement.

7. Proper safe-guards on power lines to prevent electrocution, where needed.

Ecological Significance and General Value:

1. U. S. National symbol - with all accompanying traditional, cultural, aesthetic, historical, symbolic and inspirational qualities with which this bird is imbued.

2. Important indicator species to monitor effects of pesticides and other environmental contaminants.

3. Predation and maintenance of healthy prey populations.

4. Bird-watching as a popular past-time, plus wildlife photography.

5. Political expediency to "save" the species.

6. Excellent educational tool to teach conservation attitudes to children.

References: (personal communication)

Mr. Jackson Abbott, 8501 Doter Drive, Alexandria, Va. 22308.

Mr. J. Appel, Refuge Manager, Chincoteague National Wildlife Refuge, Box 62, Chincoteague, Va. 23336.

Mr. W. Julien, Refuge Manager, Blackwater National Wildlife Refuge, Cambridge, Maryland.

National Audubon Society, Research Division, 115 Indian Mound Trail, Tavernier, Fla. 33070.

Mr. Thomas Norris, Jr., Superintendent, Assateague Island National Seashore, Rt. 2, Box 294, Berlin, Md. 21811.

A. Sprunt. 1969. Population trends of the bald eagle in North

America. p. 347-351. In Peregrine Falcon Populations: their biology and decline. J. J. Hickey (ed.) Univ. of Wisconsin Press, Madison, Wisc.

A. Sprunt and F. J. Ligas, 1966. Audubon bald eagle studies, 1960-1966. National Audubon Soc., N. Y. 6 p.

C. Snow. 1973. Habitat management series for endangered species. Southern Bald Eagle and Northern Bald Eagle. Report No. 5, Technical Note. Bureau Lane Mgt., U.S.D.I., Denver Public Library, Denver, Colorado.

Literature:

Abbott, J. M. 1965. The Chesapeake Bald Eagles: Summary report, 1936, 1955-1965. Atl. Nat., vol. 22(1):20-25.

Abbott, J. M. 1967. Bald Eagle Nesting report, Chesapeake Bay region. Atlantic Naturalist, vol. 23(1):19.

Abbott, J. M. 1968. Bald Eagle Nesting report, Chesapeake Bay region. Atlantic Naturalist, vol. 24(1):18.

Abbott, J. M. 1969. Bald Eagle Nesting report, Chesapeake Bay region. Atlantic Naturalist, Vol. 24(4):212.

Abbott, J. M. 1970. American Eagle nest survey of the Chesapeake Bay region.

Abbott, J. M. 1971. American Eagle nest survey of the Chesapeake Bay region.

Abbott, J. M. 1972. Chesapeake Bay Bald Eagle nest survey.

Coon, Locke, Cromartee and Reichel. 1970. Causes of Bald Eagle mortality - 1960 - 1965. Jour. Wildlife Diseases. vol. 6:72-76.

Mulhern, Reichel, Locke, Lamont, Belisle, Cromartie, Bagley and Prouty. 1970. Organochlorine residues and autopsy data from Bald Eagles. Pesticides Monitoring Jour. vol. 4(3):141-144.

National Audubon Soc. 1966. Bald Eagle Studies - 1960-1966. Research Department., Indian Mound Trail, Tavernier, Fla. Mimeo copy. 6 p.

Sprunt, A. IV, et al. 1973. Comparative productivity of six Bald Eagle populations. Paper presented at North American Wildlife Conference, March 19, 1973, Washington, D. C.

Weimeyer, Mulhern, Ligas, Hensel, Mathisen, Robards and Postupalsky. 1972. Residues of organochlorine pesticides, polychlorinated biphenyls, and mercury in Bald Eagle eggs and changes in shell thickness - 1969 and 1970. Pesticide Monitoring Jour. vol. 6(1): 50-55.

OSPREY *Pandion haliaetus*

Order: FALCONIFORMES

Family: PANDIONIDAE

Estimated Numbers:

Virginia = 500 plus pairs; in 1972, 390 nests, 130 known productive nests, 262 known young produced, 209 known fledglings (Byrd, 1973).

Delaware = 25 to 30 pairs

Maryland = 750 pairs ±

Chesapeake Bay has largest known population in North America

Present Distribution:

Virginia - See map 2 of locations of nest sites provided by Dr. M. Byrd, Dept. of Biology, College of William and Mary, Williamsburg, Va. Also see Table I, Proceedings of the first North American Osprey research conference (Byrd, 1973).

Delaware - Information available at Delaware Dept. Natural Resources and Environmental Control (Lesser, 1973); however, many of the sites are outside Chesapeake Bay drainage.

Maryland - See map 2, with nest site locations provided by Mr. Stan Wiemeyer, Research Biologist, Patuxent Wildlife Research Center, Laurel, Md.; and by Mr. Jan Reese, researcher, St. Michaels, Md.

Selected Areas with Active Nests:

	<u>1970</u>	<u>1971</u>
Virginia - James River	3	6
Chickahominy River	-	12
York River	11	28
Mobjack Bay	15	17
New Pt. Comfort	50	45
Rappahannock River	57	77
Fleets Bay	17	29

	<u>1970</u>	<u>1971</u>
Eastern Shore Atlantic Side	41	46
Eastern Shore Ches.Bay Side	-	49
Total Active Nests	194	309

Maryland/Virginia - Lower Potomac River east of Rt. 301
(Wiemeyer, 1972)

Maryland Shore - 100 pairs
 Virginia Shore - 40 pairs
 Pt. Lookout at
 mouth of Potomac
 River - 20+ pairs
 Smith Pt. at
 mouth - 20-30 pairs

Maryland - lower part of Patuxent River - 10± pairs
 (Wiemeyer, 1972)
 from Cove Pt. at mouth of Patuxent To Fair Haven,
 south of Annapolis - 1 to 2 pairs (Wiemeyer, 1972)

from Chester River to Martin Wildlife Refuge along
 Eastern Shore of Md. to Va. border of Delmarva
 Peninsula - 500 to 600 pairs (Reese, 1973)

Poplar Island - 30 to 35 pairs
 Broad Creek - 50 pairs
 Martin N.W.R. - 20 to 30 pairs
 Choptank River - 24 pairs
 South Marsh Island and Bloodworth Island -
 100 pairs

Chincoteague Natl. Wildlife Refuge - 10 to 20 pairs
 (Appel, 1972); maximum of 8 pairs (Byrd, 1973).

Assateague National Seashore - rare sightings, uncommon
 (Norris, 1973).

Delaware - Atlantic shore, mostly out of Chesapeake Bay drainage,
 from Oak Orchard to Bombay Hook National Wildlife
 Range - 20 to 30 pairs (Norris, 1973)

Oak Orchard and
 Little Bay area - 2 to 3 pairs

Little Assawoman Bay - 5 pairs	
Rehoboth Bay (1 colony)	13 pairs
(nesting on duck blinds)	
Cape Henlopen up to	
Reedy Island	6 to 8 pairs
Bombay Hook Natl.	
Wildlife Refuge	1 pair
Nanticoke Refuge	1 pair
Blackbird Creek	1 pair

Status:

Not officially classified as rare or endangered; however, is declining in specific regions and may be seriously threatened.

Reasons for Decline:*

1. It has been estimated that the annual production of ospreys must be between 0.95 to 1.30 young fledged/breeding female to maintain a stable population (Henry and Wight, 1969). (However, this may be underestimated by 5 to 10% if nests with no eggs are excluded from original figures (Henny and VanVelzen) and only the productive nests used, rather than active nests.) Byrd (1973) estimates an annual production of 1.22 young/productive nest is needed in Virginia. Reese (1965) calculated a minimum annual rate of decline of 2 to 3% in Maryland. In many areas of the Chesapeake Bay, annual production is now below these averages, as per following reports:

Maryland shore, Charles County, of Potomac River - 0.70
young fledged/active nest (Wiemeyer, 1971)
Virginia shore, as above, Westmoreland Co. - 0.70 (Wiemeyer, 1972).
Talbot County, Eastern shore, Maryland - -.96 to 1.16 (1965 -
1966) (Reese, 1970);
Talbot County, Eastern Shore, Maryland - 1.03 (1964-65) (Reese,
1965).
Virginia shore from Norfolk to Potomac River - 0.69 (1971)
0.60 (1972) (Byrd, 1973).
Martin National Wildlife Refuge, Md. - 1.4 young/active nest,
1.8 young/productive nest (Rhodes, 1972).
Choptank River, Eastern Shore, Md. - 0.93 to 0.96 (Reese, 1972).

2. The use of pesticides and other environmental contaminants is causing contamination in ospreys from accumulation of chlorinated hydrocarbons through the food chains, which in turn are responsible for egg failure in active nests. Reproductive decline in ospreys has been reported from many sections of the United States (Ames, 1966), Hickey,

(1969), etc. In Maryland, Hickey and Anderson (1968) reported 2.0 to 2.8% decrease in egg shell weights. This is resulting in egg breakage and embryonic death.

3. Losses to osprey eggs and young by predators such as raccoons and rats.

4. Destruction of nests and nestlings by high tides, waves and winds.

5. Destruction of nests by U. S. Coast Guard personnel when they are found on top of lighted navigational markers. For example, 43 nests were removed in Talbot Co., between 1963-1969, (Reese, 1970) and maybe as high as 15 nests/year in the central Chesapeake Bay region (Reese, 1965).

6. Increased use of boats and disturbances around osprey nest sites.

Protective Measures Taken or Proposed:

1. Artificial nesting platforms have been erected and maintained annually to enhance osprey nesting success. Reese (1970) erected 133 platforms between 1964 and 1969 in Talbot Co.; and a total of 72 nests platforms have been erected in Martin National Wildlife Refuge. These have shown a high degree of occupancy; for example, a total of 59 nests were active on the 72 structures between 1968 and 1971 (Rhodes, 1972). Production tripled since artificial nest structures were started in 1968, up to 1971.

2. Coast Guard directive against removing osprey nests from navigational aids was issued by Admiral Bullock. It covers Coast Guard personnel and activities in Maryland, Virginia, North Carolina and part of New Jersey. Nests may not be touched during breeding season but may be removed afterwards if interfering with navigational aids.

3. Dr. Byrd and students are putting up signs around marinas and fishing sites asking boaters and fishermen not to tie up next to osprey nests because this may drive off parents and cause death of eggs or young.

4. Continued research on effects of pesticides on osprey reproduction such as presently being carried out at Patuxent Wildlife Research Center, and other research centers.

5. Continued continental censusing and evaluation of populations, plus continued surveillance of Chesapeake Bay populations.

6. Discontinued use of pesticides and other chemicals so as to increase chances of reproductive success; also abatement of water pollution so as to increase fish (food) supply.

Ecological Significance and General Importance:

1. Aesthetic value as a bird of prey and beautiful species.
2. Important indicator species to monitor effects of pesticides, especially in Chesapeake Bay which is near large metropolitan centers.
3. Predation and maintenance of health in prey populations.
4. Bird-watching as a popular recreation.

References: (personal communication)

Mr. J. Appel, Refuge Manager, Chincoteague National Wildlife Refuge, Chincoteague, Maryland.

Dr. M. Byrd, Dept. Biology, College of William and Mary, Williamsburg, Virginia.

Charles Lesser, Mgr. Technical Services, Division Fish and Wildlife, Dept. Natural Resources and Environmental Control, Edward Tathall Bldg., Legislative Add. and D Street, Dover, Delaware, 19901.

T. F. Norris, Supt. Assateague National Seashore, Rt. 2, Box 294, Berlin, Md.

Jan Reese, Researcher, St. Michaels, Md., 21663; also c/o Medical College, Johns Hopkins University, Baltimore, Maryland.

Stanley Wiemeyer, Research Biologist. Patuxent Wildlife Research Center, Laurel, Maryland.

Literature:

Ames, P. L. 1966. DDT residues in the eggs of the osprey in the northeastern U. S. and their relation to nesting success. Jour. Applied Ecology 3 (suppl): 87-97.

Byrd, M. (Edit.) 1973 in press. Proceedings of the first North American osprey research conference. Dept. Biology, College of William and Mary, Williamsburg, Va.

Henry, C. J. and J. C. Odgen. 1970. Estimated status of osprey populations in the United States. *Jour. Wildlife Mgt.* 34(1): 214-21.

Henry, C. J. and W. T. VanVelzen. 1972. Migration patterns and wintering localities of American Ospreys. *Jour. Wildlife Mgt.* 36(4):1133-1141.

Henry, C. J. and H. M. Wight. 1969. An endangered osprey population: estimates of mortality and production. *Auk* 86(2): 188-198.

Hickey, J. J. (Edit.) 1969. *Peregrine falcon populations: their biology and decline.* Univ. Wisconsin Press, Madison, Wisc. 596 p.

Hickey, C. J. and D. Anderson. 1968. Chlorinated hydrocarbons and eggshell changes in raptorial and fish-eating birds. *Science* 162 (3850):271-273.

Reese, J. 1965. Breeding status of osprey in central Chesapeake Bay. *Maryland Birdlife* 21(4):105-108.

_____ 1969. A Maryland Osprey population 75 years ago and today. *Maryland Birdlife*, 25(4):116-119.

_____ 1970. Reproduction in a Chesapeake Bay osprey population. *Auk* 87(4):747-759.

_____ 1972. Osprey nesting success along the Choptank River, Maryland. *Chesapeake Science* 13(3):233-235.

_____ 1972. Supplement Report #3: Breeding osprey survey of Choptank River, Md., Maryland Ornithological Society, Unpublished.

Rhodes, L. 1972. Success of osprey nest structures at Martin National Wildlife Refuge. *Jour. Wildlife Mgt.* 36(4):1296-1299.

Wiemeyer, S. 1971. Reproductive success of Potomac River ospreys - 1971. *Chesapeake Science*, Vol. 12(4):278-280.

ARCTIC PEREGRINE FALCON Falco peregrinus tundrius

Order: FALCONIFORMES

Family: PANDIONIDAE

Estimated Numbers: known as fall (and spring to a lesser degree) migrants only, passing Atlantic oceanside. No known breeding birds now reported anywhere in eastern United States (Cade, 1973); up to 2000 individuals (Mattox, 1973); about 1000 first year migrants (Ruos, 1972), 500+ individuals (Ward, 1973).

Present Distribution: Usually sighted at Assateague Island in Maryland and Virginia (36 mi. x 1+ mi.) along the Atlantic Coastal migration route. Largest concentrations found within two-mile swath of ocean. This is probably the largest and most significant resting and feeding site for Arctic Peregrines anywhere in continental United States (Ward, 1973). (Lies outside Chesapeake Bay area).

The major area at Assateague Island is on the north edge of Fox Hill Levels. Other sites given in table below.

PEREGRINE SIGHTINGS ON ASSATEAGUE ISLAND
(taken from Table 4, Ward & Berry, 1972)

	<u>1970 Observation Time</u> in %	<u>1971</u>	<u>Observation Time</u> in %
Maryland, North of State Park	1	3	12
Md., State Park	-	NT	2
Md. beach south State Park	18	52	53
Md., Fox Hills Levels	41	36	40
Md., Little Fox Levels	-	NT	2
Virginia Sector	8	9	11

Barrier beaches along islands of Delmarva Peninsula where falcons also occur include: Fisherman, Myrtle, Smith, Shipshoal, Hog, Revel, Cobb, Parramore, and Wreck Islands.

Occasional sporadic sightings are seen around Chesapeake Bay region; more often spring migrants may be seen on west side of Chesapeake Bay and Delmarva oceanside. Birds usually stay 1 to 5 days en route. 10% or less of the adults migrate along the Atlantic Coast beaches with the immatures. Usually the immatures are in a ratio of 5 or more to every one adult (Shor, 1970, b).

Status: Classified as endangered on the U. S. Dept. of Interior's official list. No appreciable recent decline in general abundance of migrants along Atlantic Coast (Ruos, 1972; Ward & Berry, 1972; 92nd Congress). In addition, the age ratios of immatures to adults in 1970-71 seemed similar to those recorded since 1938 (Ward & Berry, 1972; Ruos, 1970). Nevertheless, there is a strong implication that a substantial population decline took place after 1947 (Nye, 1969; Ward & Berry, 1972). Appel (1972) reports fewer sightings of immatures at Chincoteague National Wildlife Refuge in 1972.

Reasons for Decline:

1. Shooting of birds.
2. Destruction of nests.
3. Stealing of eggs, young, and adults, and trapping by falconers and collectors.
4. Breeding failure resulting from cumulative effects of pesticides and other environmental contaminants, affecting the reproductive and egg shell mechanisms. The problem resulting from cumulative effects of pesticides and other environmental contaminants is very well presented by Ward & Berry, 1972, p. 484-485. In addition, there is an occasional direct poisoning from pesticides. There is reason to believe that, based on experience with the American Peregrine Falcon, this subspecies will go into the same pattern of decline even though many migrants seem to come from Greenland where there is a low contamination by pesticides at present.
5. Periodic short-term adverse effects of weather on reproduction, for example, summer of 1972 (Ruos, 1970).

Protective Measures Taken:

1. Federal and most State laws protect the species.
2. Federal year-round protection by law in the U. S., plus most States and Provinces.
3. Research investigations into artificial propagation techniques at Cornell University's Laboratory of Ornithology, Patuxent Wildlife Research Center, and possible other research centers in Canada, plus by 20 or more falconer-aviculturalists.
4. Protection by Denmark, and its colony, Greenland.
5. Surveillance and protection of known nest sites out West and in Canada and Alaska.
6. Cooperative program between the Canadian Wildlife Service and U. S. Wildlife agencies.
7. Continued monitoring of pesticides and effects on birds of prey.

Protective Measures Proposed:

1. An immediate and forceful recommendation against the proposed hardtop road which is to be built between the Chesapeake Bay bridge in Maryland to the Virginia bridge, following along Assateague Island National Seashore. This development would destroy a significant wilderness area which falcons presently utilize for feeding and resting during migration.
2. Further acquisition and protection of barrier beaches and islands along the Atlantic side of Delmarva Peninsula to provide additional safe resting sites for migrating falcons.
3. Reduced use of persistent and other environmental contaminants in the U. S. and Canada and Europe.
4. Continued research on reproductive failure reasons; and improved artificial breeding in captivity.
5. Increased legal protection and enforcement in all countries where Peregrine Falcons breed and winter.
6. Limit use by surf fishermen and motor vehicles along barrier beaches during time of migration of falcons, because resting should not be disturbed. (This added stress factor may be more deleterious than normal if birds are loaded with DDT, DDE, DDD. The birds appear to have less tolerance to disturbances when in this condition).

7. Strengthen efforts to monitor flyways and obtain accurate annual migration numbers and any changes in numbers or age ratios which might signal decline of populations.

8. Encourage competent falconers to trap immature birds and handle them with controlled diets (free of chemicals), exercise, artificial incubation of eggs to prevent breakage, etc. (Cade, 1970).

9. Refrain from planting erosion grasses on barrier beaches, and forbid camping on traditional resting sites so as not to disturb birds unnecessarily or obstruct their surveillance of surroundings.

Ecological Importance and General Importance:

1. Aesthetic appeal as a magnificent bird of prey.
2. Bird-watchers, photography, nature loving.
3. Important indicator species to use in monitoring effects of pesticides, and other environmental contaminants.
4. Predation which helps maintain a healthy population of prey species.
5. Traditional, historical and scientific use of falcons by falconers.

References: (personal communication)

Mr. J. Appel, Refuge Mgr. Chincoteague National Wildlife Refuge, Chincoteague, Virginia.

Dr. Tom Cade, Professor. Researcher. Laboratory of Ornithology, Cornell University, Ithaca, New York 14850.

Mr. J. Mattox. Asst. Deputy Director. Dept. Natural Resources, 907 Ohio Depts. Bldg., Columbus, Ohio, 43215.

Dr. Prescott Ward. DVM. Ecology Division, Edgewood Arsenal, Baltimore, Maryland.

Mr. Jim Ruos, Research biologist. Patuxent Wildlife Research Center, Laurel, Maryland.

Literature:

Cade, T. 1970. A program for managing the survival of Peregrine Falcons in the 1970's (Outline of ideas). Unpublished report. Laboratory of Ornithology, Cornell University, Ithaca, N. Y. 14850.

Hickey, J. J. (Edit.) 1969. Peregrine Falcon populations, their biology and decline. Univ. of Wisconsin Press, Madison, Wisc. 596 p.

92nd Congress. Fish and Wildlife Legislation, Rt. 2, Hearings of subcommittee on Fish and Wildlife Conservation; Hawks, Owls, and Eagles. No. 92-14. Trends in populations of raptors in North America. Special briefing summary. Government Printing Office.

Nye, A. G., Jr. 1969 Assateague Island peregrines, 1938-1947. Paper presented at North American Falconers Association Peregrine Falcon symposium. Ft. Collins, Colo. Nov. 26-29, mimeo. 7 p.

Ruos, J. L. 1970. Correlation of Arctic temperatures in July with numbers of tundra peregrines (Falco peregrinus tundrius) seen per part day in October along the mid-Atlantic coast. Special Report, Patuxent Wildlife Research Center, Laurel, Md. 5 p.

Shor, W. 1970. (a). Banding recoveries of Arctic migrant peregrines of the Atlantic Coast and Greenland populations. Raptor Research News 4(4):125-127.

Shor, W. 1970. (b). Peregrine Falcon population dynamics deduced from band recovery data. Raptor Research News 4(2):49-59.

Snow, C. 1972. Habitat management series for endangered species. Report No. 1. American Peregrine Falcon and Arctic Peregrine Falcon. Technical note. Bureau of Land Management, U.S.D.I., Washington, D. C.

Ward, F. P. and R. B. Berry. 1972. Autumn migrations of Peregrine Falcons on Assateague Island, 1970-71. Jour. Wildlife Management, vol. 36(2):484-492.

IPSWICH SPARROW* Passerculus princeps

Order: PASSERIFORMES

Family: FRINGILLIDAE

* Discussed more fully in reports: "Rare, Endangered, and Threatened Fish and Wildlife of the Maine Coast", and "Rare, Endangered, and Threatened Fish and Wildlife of the Atlantic Coastal Plain", by A. LaBastille.

Estimated Numbers and Present Distribution: only rare sightings are reported from Chesapeake Bay region, mainly on Assateague Island and other barrier beaches of Delmarva Peninsula during migrations. Sparrows prefer undisturbed coastal beaches with dunes, rocks and grass; therefore, might be expected to stop and rest wherever appropriate habitat still exists.

BOG TURTLE Clemmys muhlenbergi

Order: TESTUDINATA

Family: TESTUDINIDAE

Estimated Numbers: Very difficult to estimate, but probably in magnitude of 30 adults in Chesapeake Bay area of Maryland (Nemuras, 1973); Arndt (1973) estimates 500+ adults in all Chesapeake Bay region; Barton (1973) estimates 1000+ (15 + colonies).

Present Distribution:

Maryland: only recorded from 3 counties: Baltimore, Harford and Cecil and most of these locations actually occur on the Piedmont area; however, the following are probably within the Chesapeake Bay drainage (Nemuras, 1967).

- a. Near Conowingo Dam, Susquehanna River, Cecil Co. 1965-68 and 1947-1969 records.
- b. Broad Creek, Harford Co. - old record.
- c. Elk Neck, Cecil Co. - 1945 record.
- d. Grave Run Mills, Baltimore Co. - 1941 record.
- e. Eko, Baltimore Co. - 1960 record.
- f. Gunpowder Falls, Baltimore Co. - 1960 record.
- g. Sassafras River, Kent Co. - This is the southernmost point where turtles are found on Delmarva Peninsula.
- h. Bel Air, on Rt. 1 near Baltimore - possibly gone.

Delaware:

- a. Newark, New Castle Co. - 1955 record (Nemuras, 1972).
- b. Northern 3/4 of New Castle Co. (Nemuras, 1972).
- c. Odessa, New Castle Co. (Arndt, 1972)

Virginia: No colonies known on coastal plain.

Reasons for Decline:

1. Destruction of bogs.
2. Removal of large numbers of specimens from their colonies by collectors. Bog turtles bring \$100 to \$150 or more per turtle in pet stores and from individual sales.
3. Drying up or pollution of cold, clear ground water and seepage water sources above bogs can change bog habitat and drive out turtles.
4. Flooding, both natural (especially Hurricane Agnes), and man-made (by dams) destroys bogs and colonies of turtles.

Protective Measures Taken:

1. Protected by state law in New York, Pennsylvania, New Jersey and Maryland (Oct. 1972). Illegal to take, sell, transport or hold these turtles, \$1000 fine in Maryland; no enforcement or fines in New Jersey; \$10 in Pennsylvania.
2. A single swamp has been bought by a naturalist to save one colony of Bog Turtles.
3. Extreme secrecy among Bog Turtles investigators and conservationists to prevent information about locales from being made public.

Protective Measures Proposed:

1. Acquire known Bog Turtle bogs and swamps with adjacent drainage basins to save from development. Possibly introduce turtles to prime habitat in hopes of establishing new colonies.
2. Set up state Bog Turtle sanctuaries.
3. Strict fines and enforcement against purchase and sales by pet dealers and collectors.
4. Public education about value of bogs and wetlands and their unique fauna.
5. Continue censuses and life history studies to determine localities, numbers and disturbances, (may be undertaken in 1973 by James Weaver, for Smithsonian Institution).

Ecological Significance and General Values:

1. Of no specific ecological importance, but does add to diversity of wetland fauna.
2. A very old relic, boreal, species of evolutionary interest.
3. Aesthetically pleasing reptile of remarkable intelligence and adaptability to captivity.
4. Scientific and natural appeal of wetlands areas.

References: (Personal communication)

Dr. Rudolf Arndt, Senior Research Biologist, c/o Ichthyological Associates, 100 S. Cass Street, Middletown, Del. 19709.

Mr. A. J. Barton, c/o Undergraduate Program, National Science Foundation, Washington, D. C.

Mr. Ken Nemuras, Herpetologist, 5101 Gwynn Oak Ave., Baltimore, Maryland, 21207.

Mr. Jim Weaver, Herpetologist, 30 Eshelman Rd., Lancaster, Pa. 17601.

Literature:

Arndt, R. G. 1972. Additional records of Clemmys muhlenbergi in Delaware, with notes on reproduction. Bull. Md. Herp. Soc. 8(1):1-5.

Barton, A. J. and J. W. Price, Sr. 1955. Our knowledge of the Bog Turtle, Clemmys muhlenbergi, surveyed and augmented. Copeia. 3:159-165.

Campbell, H. W. 1960. The Bog Turtle in Md. The Md. Naturalist, vol. 30(1-4): 15-16.

Nemuras, K. T. 1966. Some records for Clemmys muhlenbergi in Cecil Co., Md. Bull. Md. Herp. Soc. 2(2):1-2.

Nemuras, K. T. 1967. Notes on the natural history of Clemmys muhlenbergi, Bull. Md. Herpetological Society, vol. 3(4):80-96.

Weaver, J. (editor) Bog Turtle Conservation News. Oct. 17, 1972. etc.

SEA TURTLES* Green Turtle - Chelonia mydas
Loggerhead Turtle - Caretta caretta
Leatherback Turtle - Dermochelys coriacea
Atlantic Ridley Turtle - Lepidochelys kempii
Hawksbill Turtle - Eretmochelys imbricata

Order: CHELONIA

Family: CHELONIDAE

* Discussed more fully in Atlantic Coastal Plain report.

Estimated Numbers and Distribution:

All are endangered or threatened. With exception of the Loggerhead Turtle. The occurrence of marine turtles is largely sporadic and undeterminable along the Atlantic Coast, especially Chesapeake Bay area. The presence of barrier beaches and islands on the Atlantic side of Delmarva Peninsula, and bays of Chesapeake Bay Region, provide possible areas where turtles can rest and feed on journeys along coast.

Green Turtle - rare but regular wanderer along coast - 20 to 30 nest per year (Pritchard, 1972), Rainey, 1972), (Brongersman, 1972). Noted in summer months in Calvert County and Worcester County, Maryland, (Cooper, et al, 1972).

Loggerhead Turtle - most important remaining nesting localities are between Florida Keys and North Carolina.

Noted at Worcester, Wicomico, Dorchester and Calvert Counties in Maryland (Cooper, et al, 1972).

Delaware Fish and Game personnel report few sightings at Delaware River Bay. May have nested historically along Delmarva barrier beaches.

Leatherback Turtles - only sporadic and rare captures on coast (Pritchard, 1972), (Rainey, 1972), (Brongersman, 1972). Four specimens known from shores of Chesapeake Bay: (3 in Calvert County, one in Dorchester County, Cooper, et al., 1972).

Atlantic Ridley Turtle - commonly captured as immatures along coast as far as Mass. (Pritchard, 1972), Rainey, 1972), (Brongersman, 1972).

4 Maryland specimens known: one from Baltimore Harbor, 2 from

Calvert County, 1 from mouth Potomac River (Cooper, et al, 1972).

Hawksbill Turtle - very sporadic to Massachusetts (Brongersman, 1972). No known specimens from Maryland, but undoubtedly occurs in estuaries of Potomac and other rivers (Cooper, et al, 1972).

Protective Measures Proposed:

1. Educate public about endangered status of sea turtles and urge their cooperation towards protecting any turtles seen while on beach or while boating, fishing or swimming.
2. Acquire and protect barrier beaches along Atlantic Coast for those turtles which might possibly nest there.

References:

Delaware Fish and Wildlife Div., Dept. of Natural Resources and Environmental Control, Edward Tathall Bldg., Dover, Del., 19901.

Dr. P. Pritchard, Department of Zoology. Univ. of Florida, Gainesville, Florida, 32601.

Mr. William Rainey. Caribbean Research Institute., College of Virgin Island, St. Thomas, U. S. Virgin Islands, 00801.

Literature:

Brongersman, L. D. 1972. European Atlantic Turtles, *Zoologische Verhandelingen*, #121, 2 vols., E. J. Bryll Publ; Lyden, Netherlands.

Cooper, J. E. (Chairman), et al. 1972. Endangered amphibians and reptiles of Maryland. Report of Maryland Herpetological Society, 2643 No. Charles St., Baltimore, Md. 21218.

Hardy, J. D., Jr. 1962. Comments on the Atlantic Ridley Turtle, Lepidochelys olivacea kemp, in the Chesapeake Bay. *Chesapeake Sci.* 3(3):217-220.

Hardy, J. D., Jr. 1969. Records of the Leatherback Turtle, Dermochelys coriacea coriacea, from the Chesapeake Bay. *Bull. Md. Herp. Soc.* 5(3):92-96.

Harris, H. S. 1969. Distributional Survey: Maryland and the District of Columbia. *Bull. Md. Herp. Soc.* 5(4):97-161.

Hardy, J. D. 1972. Reptiles of the Chesapeake Bay region. Rept. to U. S. Army Corps of Engineers. in press.

Klimkiewicz, M. K. 1972. Reptiles of Mason Neck. *Atlantic Naturalist*, 27(1):20-25.

MARYLAND DARTER Etheostoma sellare

Order: PERCIFORMES

Family: PERCIDAE

Estimated Numbers: There are evidently only one or two small populations, with numbers unknown.

Present Distribution: Found only in two streams in Harford County, Md.

1. Deer Creek - This is a tributary of Susquehanna River, 1.3 miles southeast of Lanington along Stafford Road; second riffle above mouth of the Creek; 20 to 30 miles above Susquehanna.
 - a. 34 specimens taken in State Park, May, 1965, by Dr. Raney and Dr. Schwartz (Tsai, 1973).
 - b. 8 specimens taken July, 1970, and October, 1971, by Dave Thomas for private collection (Wang, 1973).
 - c. No specimens taken after careful sampling along creek 10-15 miles in length, checking over 100 holes and every few feet along course, upstream and downstream from point where specimens were caught previously (Wang, 1973).
2. Swan Creek - east Branch
 - a. 2 specimens collected in 1912 by Radcliffe and Welsh; the type specimen (see literature).
 - b. 1 specimen taken June 10, 1962, by Drs. Knapp, Richards, Miller and Foster, probably for Smithsonian Institution collection (see literature).
 - c. No specimens taken by Dr. Tsai summer of 1967 and 1968 after sampling (Tsai, 1973).

Status: Listed as endangered by USDI federal list of endangered species; also as rare or extinct (2(a)S) by IUCN list. Nevertheless, both organizations state "there are no data to support a statement that fish have declined". Species is not extinct, as of 1970-71, but is considered endangered by Wang (1973). Tsai (1973) considers species very rare.

Reasons for Decline:

1. Limited habitat. Much of its habitat was drowned out in Ice Age Melt.
2. Very small population.
3. Possible slow natural change of aquatic environment. (e.g. water chemistry, stream contours, stream bottom, ground water, etc.).
4. Evolutionary changes. Species is at the periphery of range of the subgenus.
5. Potential pollution by housing and commercial developments near streams. Presently streams are not polluted, and those nearby developments are not apparently threatening. Potential damming of creeks.
6. Extreme fluctuations in creeks could reduce population, as could siltation.
7. Conowingo Dam, downstream on Susquehanna, has not had any apparent effect on the darters in Deer and Swan Creeks.

Protective Measures Taken:

None other than to request biologists and ichthyologists not to collect or disturb fishes and habitat.

Protective Measures Proposed:

1. Acquire stream banks and bed for several miles on either side of main center of population and maintain as wooded, natural sanctuary for Maryland Darter. This would prevent dams flooding upstream and any developments would have to be set back from creek.
2. Precautions are needed to assure proper handling of sewage, storm water run-off, and other wastes from nearby residential and commercial development to prevent seepage into creeks.
3. Begin investigations into life history of darter, including population movements, to determine possible migratory or seasonal movements in and out of creeks.
4. Prevent fish collectors from decimating existing populations.

Ecological Significance and General Value:

1. Biological and genetic values as unique evolutionary development and species.
2. No value as aquarium fish or pets.
3. Diversity of freshwater fish fauna.

References: (personal communication)

Dr. E. Raney, Director, Ichthyological Associates, Forest Drive, Ithaca, New York, 14850.

Dr. Chufa Tsai, Institute of Natural Resources, University of Maryland, College Park, Maryland.

Dr. Johnson Wang, Ichthyological Associates, Odessa, Delaware.

Literature:

Knapp, L. S., W. J. Richards, R. V. Miller and N. R. Foster. 1963. Rediscovery of the percid fish Etheostoma sellare (Radcliffe and Welsh). Copeia:455.

Radcliffe, L. and W. W. Welsh. 1914. Description of a new darter from Maryland. Bull. U. S. Bur. Fisheries, vol. 32:29-32.

ACKNOWLEDGEMENTS

Special appreciation is extended to the Office of Endangered Species of the United States Department of the Interior's Bureau of Sport Fisheries and Wildlife for its cooperation and willingness to share information contained in the files and "Redbook" of threatened fish and wildlife. In addition, gratitude is expressed to the many Government biologists at the Patuxent Wildlife Research Center and at the Bird and Mammal Laboratories in the Smithsonian Institution for providing valuable information.

A number of scientists at Universities and Cooperative Wildlife Research Units, National Park supervisors and biologists, National Wildlife Refuge Managers, and State Fish and Game Agents were contacted personally, or by telephone and letter. To each of them who responded with pertinent data, sincere thanks is given.

APPENDIX D

RARE, ENDANGERED, AND ENDEMIC PLANTS OF THE CHESAPEAKE BAY REGION

by

Russell L. Kologiski
Fonda R. Hivick
Clyde W. Reed
Dale W. Jenkins

Center for Natural Areas
Ecology Program
Smithsonian Institution

RARE, ENDANGERED AND ENDEMIC PLANTS OF THE CHESAPEAKE BAY REGION

No list of rare, endangered or endemic plants exists for the Chesapeake Bay Region or for the States of Maryland, Virginia, or Delaware. A list was prepared by reviewing all of the botanical books and manuals of the region, contacting local and other botanists, and checking herbarium specimens in the National Museum of Natural History, the Gray Herbarium at Harvard, and the Herbarium of the New York Botanical Garden. Specimen records were verified and exact locality data were obtained.

Only native species of higher plants were included and rare introduced or adventive species were not considered. The rarity or endangered status was determined on the basis of rarity as a species, not with regard to local rarity in the region or State involved. There were 23 local or endemic species and valid varieties found in the region. Many of these species are known as endemic in only one or a few localities and no where else in the world. Several of the species are possibly extinct at present since they have not been collected for many years and have not been reported. Some of the species have wide distributions but are being rapidly depleted and may be endangered in the near future. No field studies were conducted to determine whether the species presently exist, but all recent information was utilized in determining rarity status.

The data for each species are presented together with distribution maps showing the species distribution, and the detailed distribution in the Bay Region. It is hoped that this will stimulate study of rare and endangered flora and will help in preservation.

Summary List of Rare, Endangered, and Endemic Plants of the Chesapeake Bay

Plant Name	Map Symbol
<u>Alnus maritima</u> (Marsh) Nuttall	1
<u>Aristida lanosa</u> var. <u>macera</u> Fern. & Grisc.	10
<u>Bacopa simulans</u> Fern.	8
<u>Bacopa stragula</u> Fern.	9
<u>Baptisia pinetorum</u> Larisey	5
<u>Calamovilfa brevipilis</u> var. <u>calvipes</u> Fern.	24
<u>Cassia fasciculata</u> var. <u>macrosperma</u> Fern.	11
<u>Diodia teres</u> var. <u>hystricina</u> Fern. & Grisc.	
<u>Eupatorium saltuense</u> Fern.	4
<u>Gaylussacia brachycera</u> (Michx.) Gray	2
<u>Juncus caesariensis</u> Coville.	23
<u>Juncus griscomi</u> Fern.	18
<u>Justicia mortuifluminis</u> Fern.	
<u>Lechea maritima</u> var. <u>virginica</u> Hodgdon	3
<u>Oxypolis canbyi</u> (Coulter. & Rose) Gern.	12
<u>Panicum aculeatum</u> Hitchc. & Chase	
<u>Panicum mundum</u> Fern.	13
<u>Pycnanthemum monotrichum</u> Fern.	20
<u>Pyxidanthera brevifolia</u> Wells.	21
<u>Rudbeckia heliopsis</u> T. & G.	22
<u>Schwalbea americana</u> L.	6
<u>Scirpus flaccidifolius</u> (Fern.) Schuyler	17
<u>Trillium pusillum</u> var. <u>virginianum</u> Fern.	14

Alnus maritima (Marsh) Nuttall

Seaside Alder

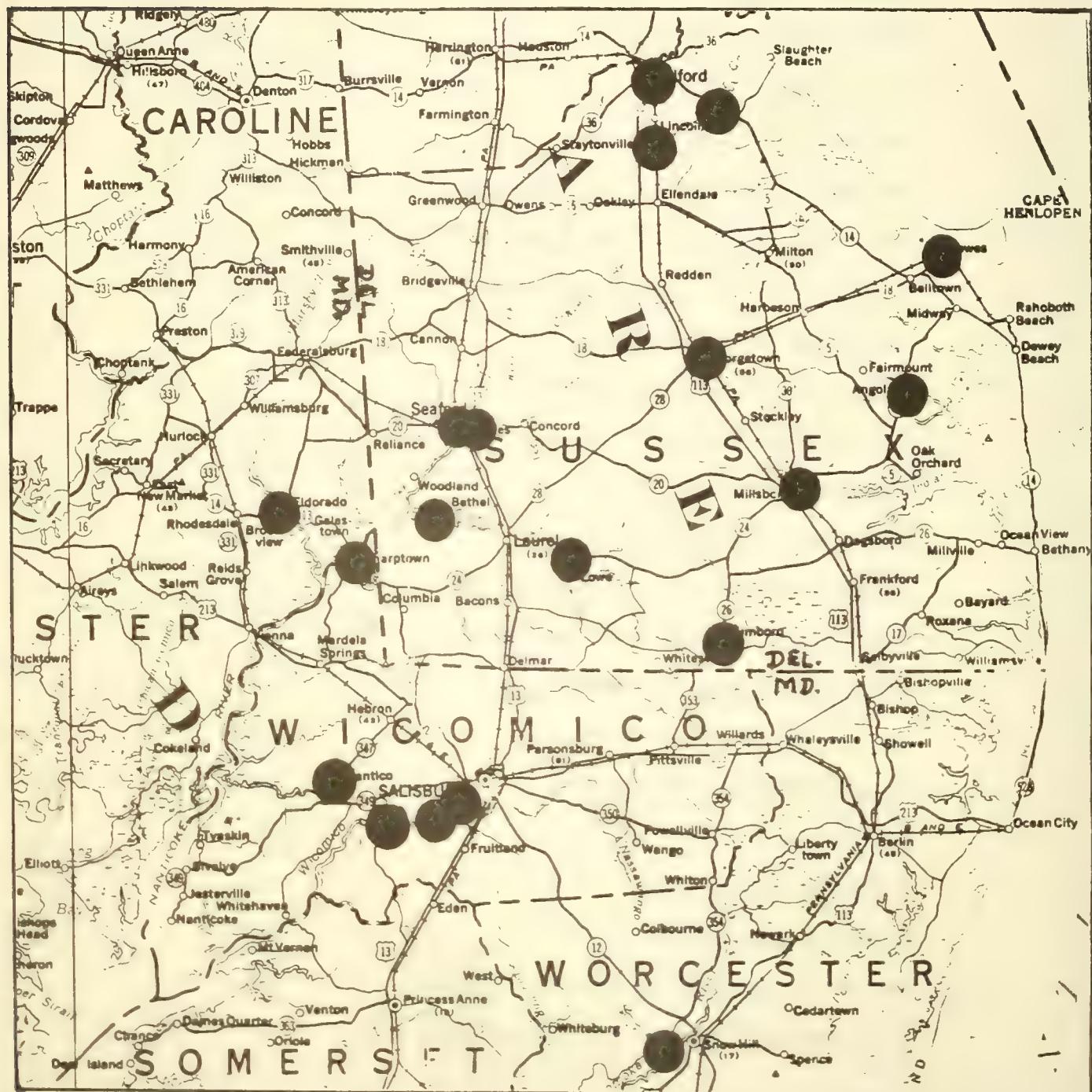
Habit: Small tree or shrub

Habitat: Pond shores and stream banks.

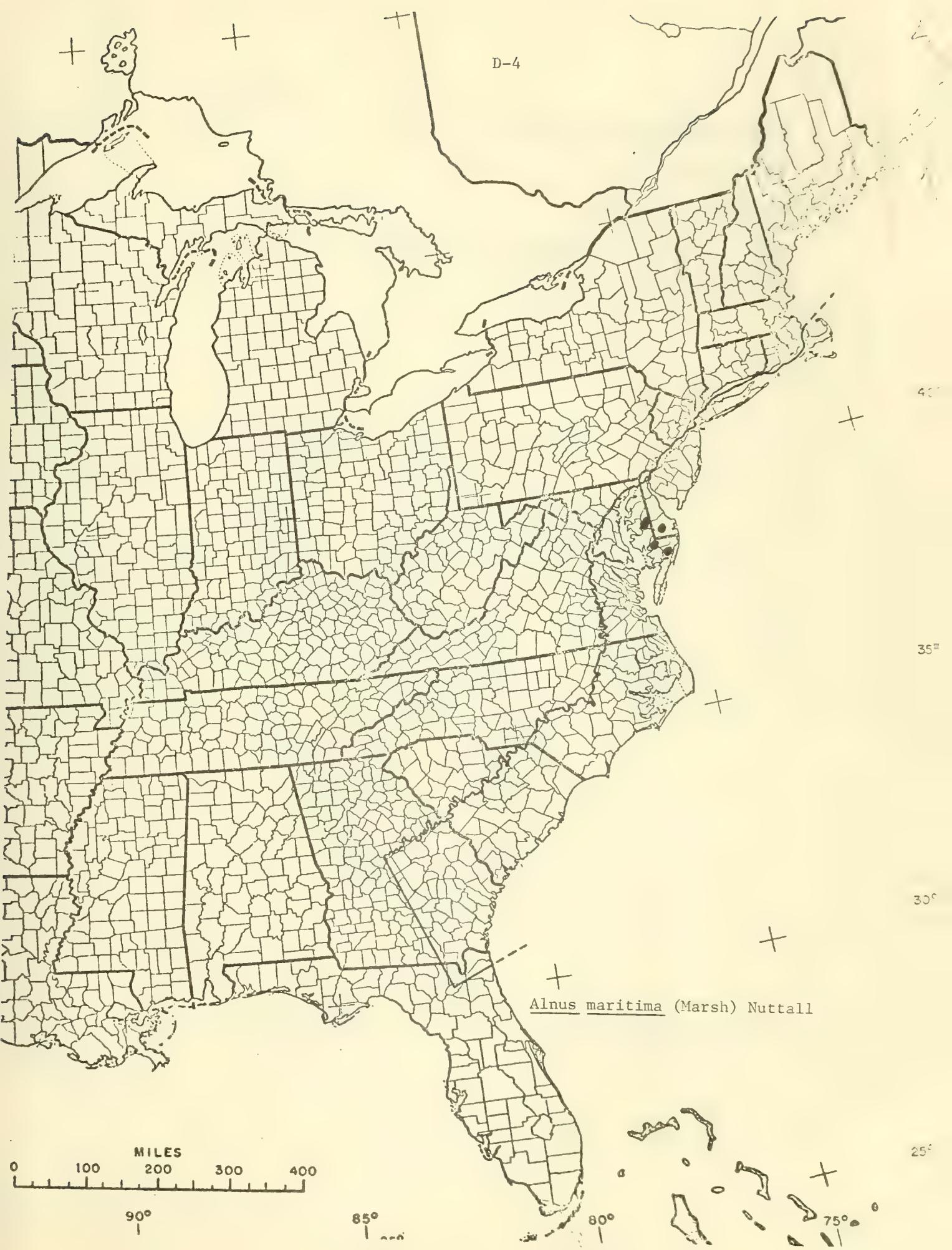
Range: Southern Delaware and adjacent Maryland, also several small populations in Oklahoma; Sussex County, Delaware and Wicomico, Worcester, Caroline Cos. Maryland.

Status: Endemic to the above regions, locally abundant.

Reference: Mr. Peter Mazzeo, National Arboretum
U.S. National Herbarium.



One inch = approximately eight miles



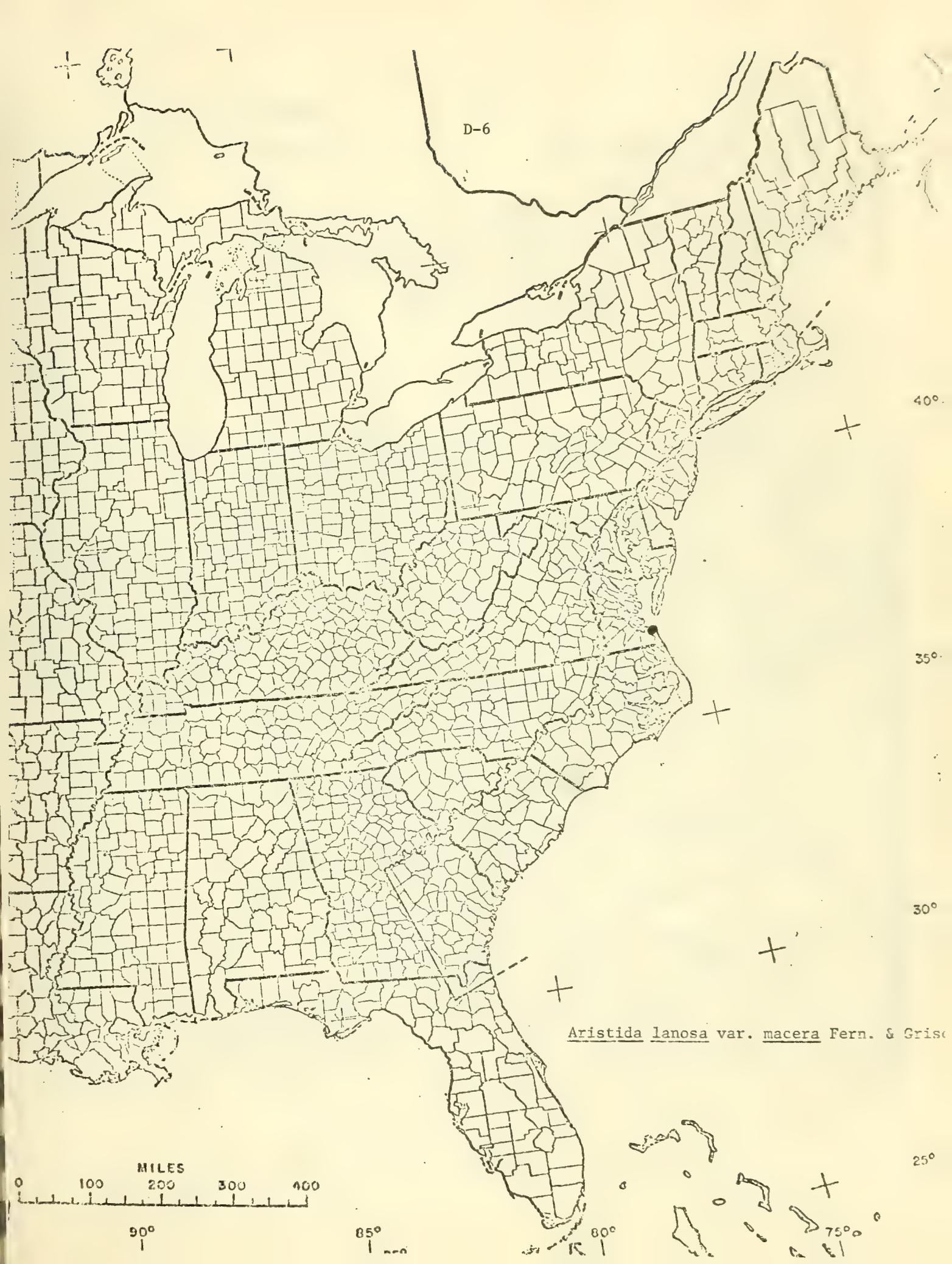
Aristida lanosa var. macera Fern. & Grisc.

Habit: Herb

Habitat: Dry woods

Range: Southeastern Virginia; Princess Anne County, Virginia

Reference: Rhodora 37:135, 1935.



SCROPHULARIACEAE

Bacopa simulans Fern.

Water-hyssop

Habit: Low herb

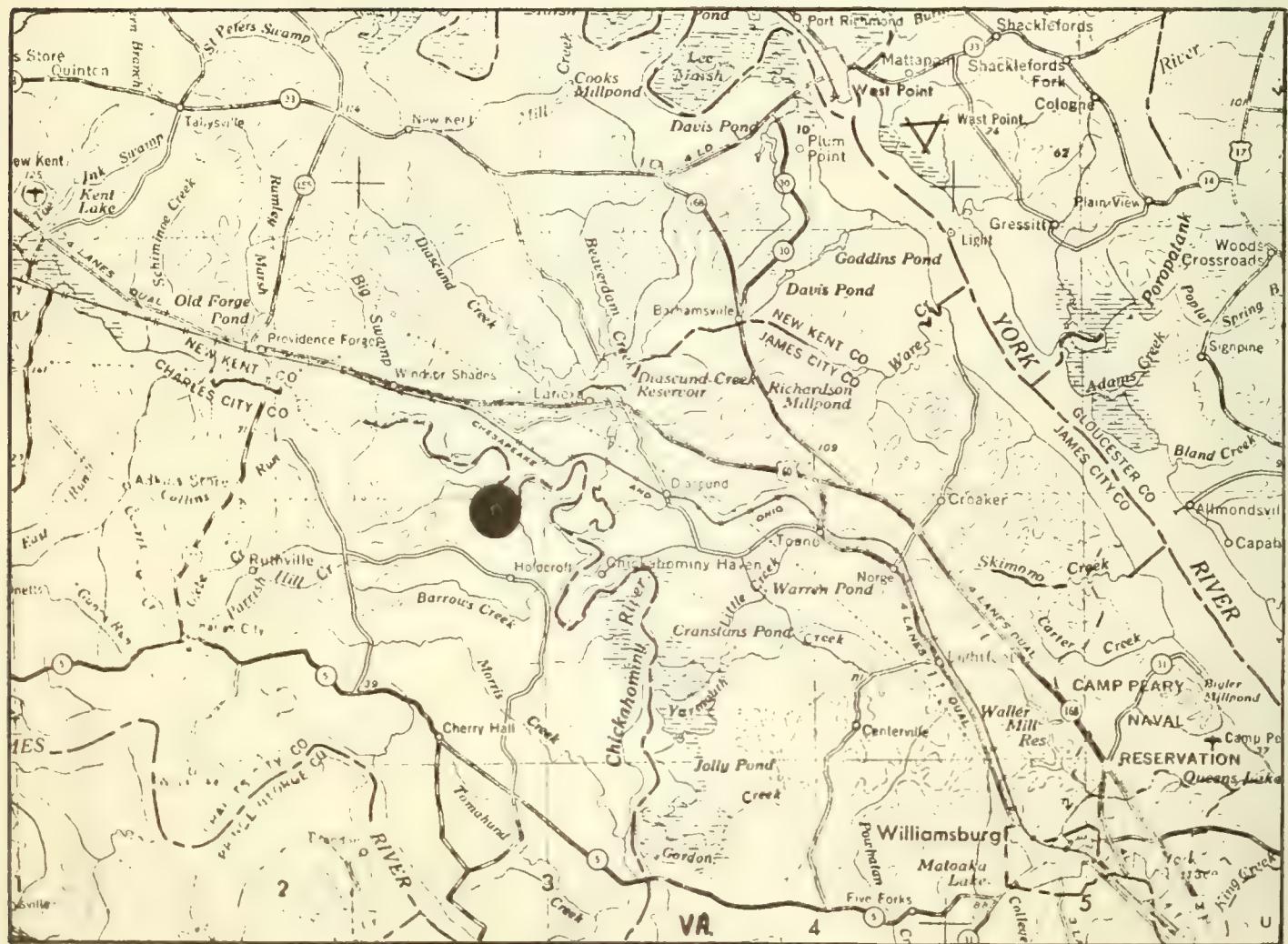
Habitat: Wet tidal shores

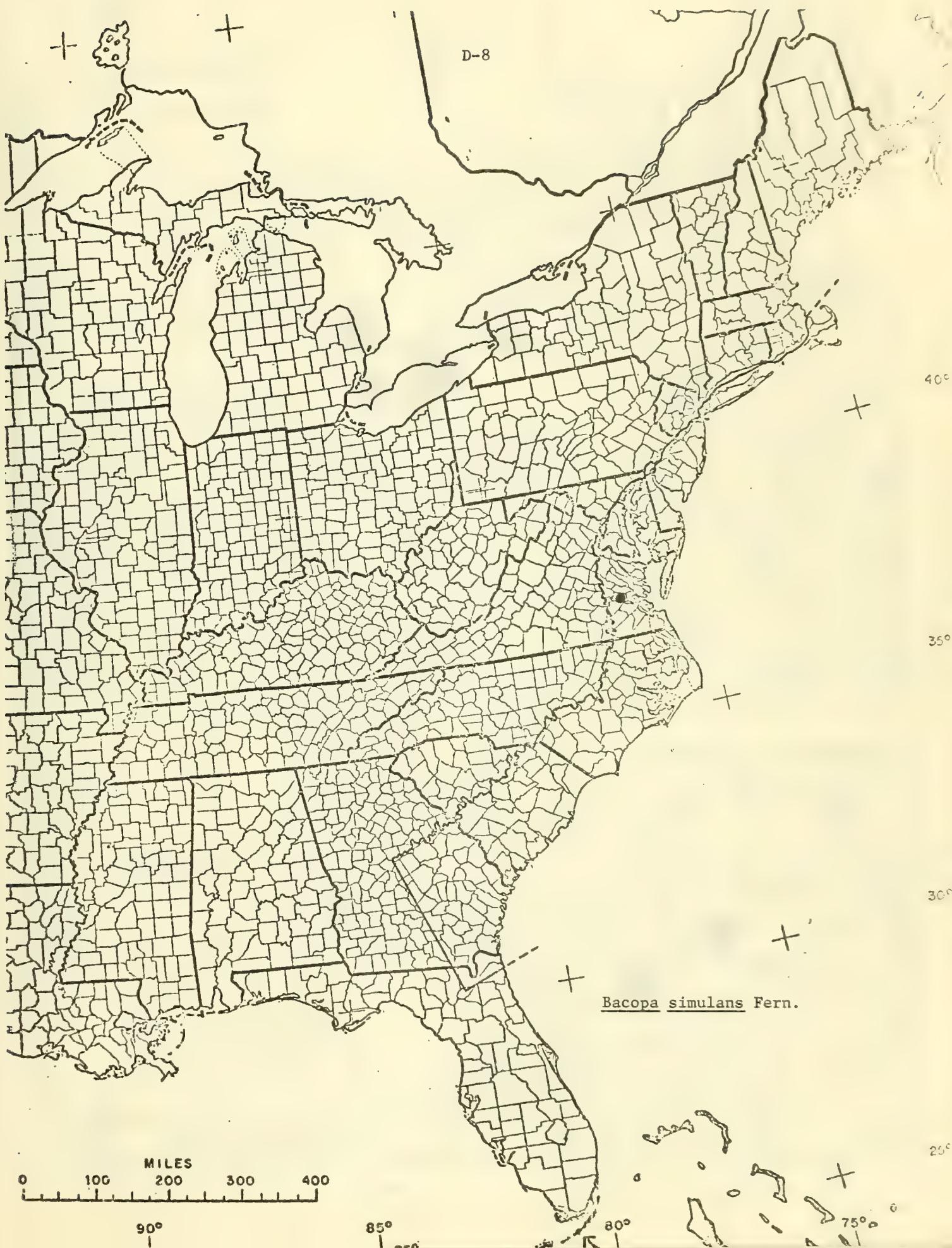
Range: Chickahominy River; Charles City Co., Virginia.

Status: Very rare, endemic and possibly endangered.

Reference: M. L. Fernald. Rhodora, Vol. 44, p.438, November, 1942.

November, 1942.
U.S. National Herbarium
Gray Herbarium





Bacopa stragula Fern.

Water-hyssop

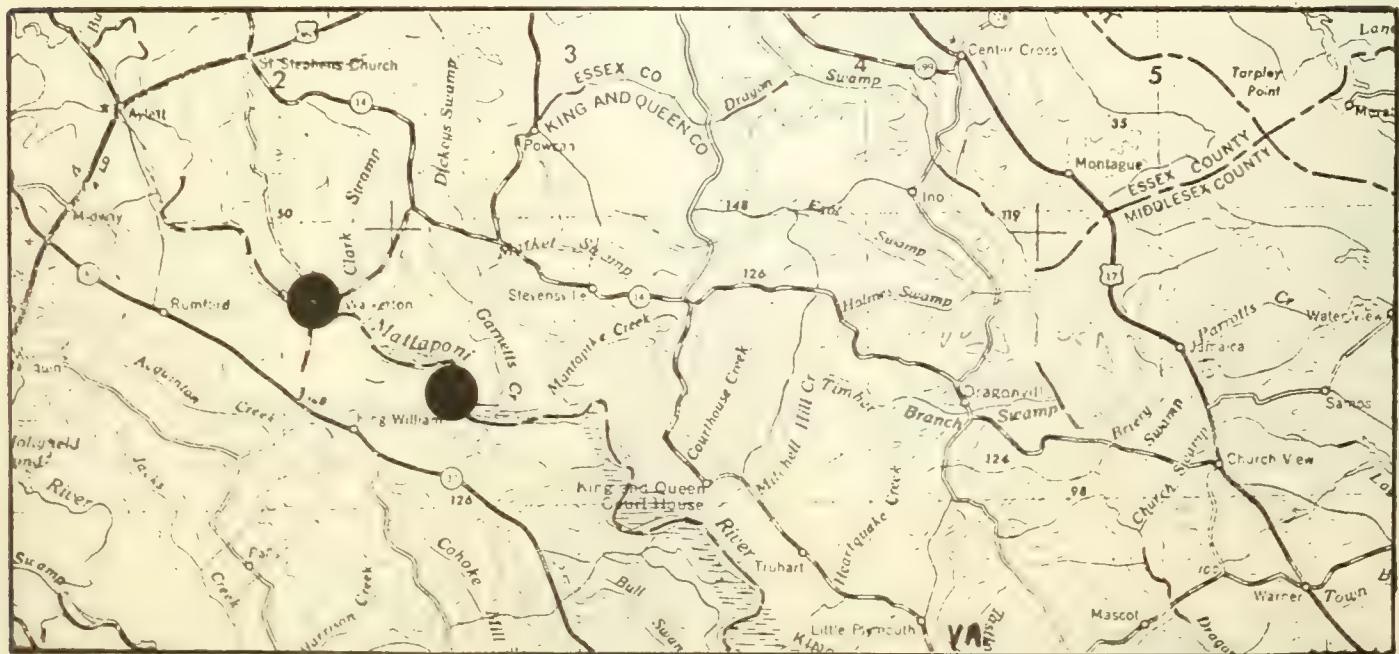
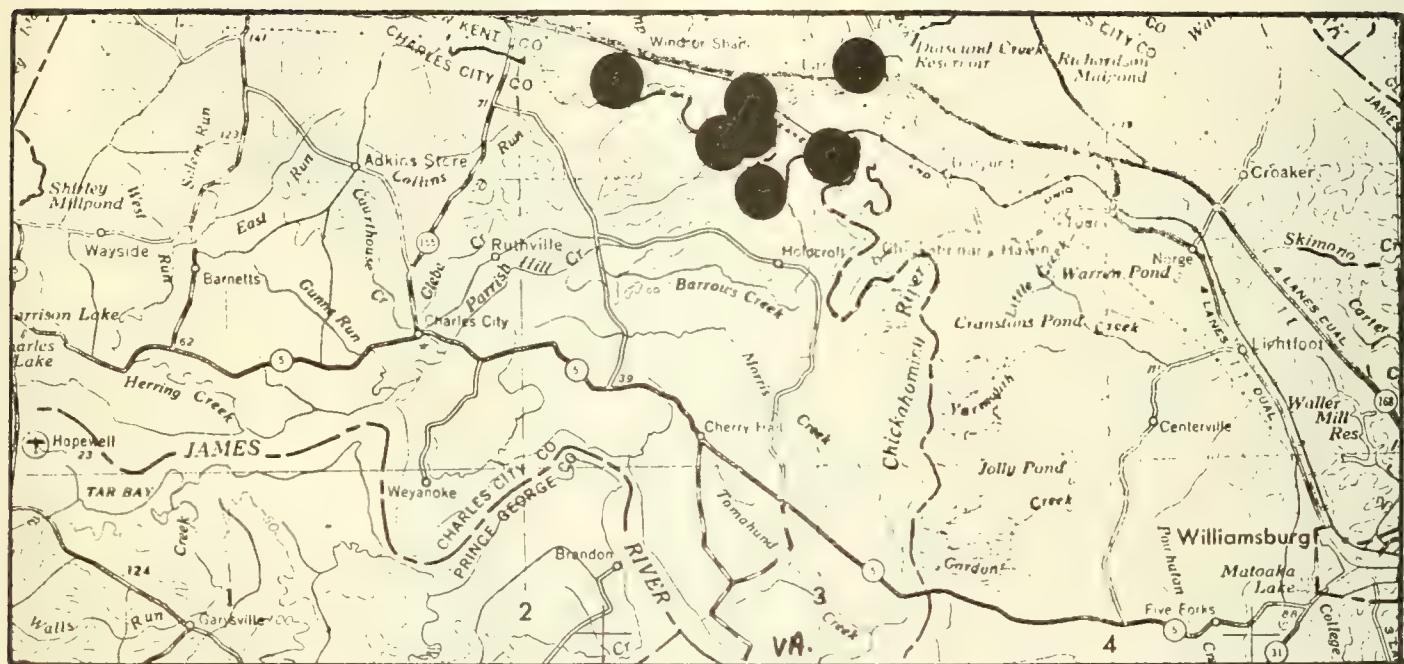
Habit: Low herb

Habitat: Wet tidal shores

Range: Chesapeake Bay drainage system; New Kent, Charles City and King William Cos., Virginia.

Status: Rare, endemic and possibly endangered.

Reference: M.L. Fernald, Rhodora, Vol. 44 p. 434, November, 1942.
U.S. National Herbarium.





Bacopa stragula Fern.

MILES

0 100 200 300 400

900

85°

800

75°

25

Baptisia pinetorum Larisey

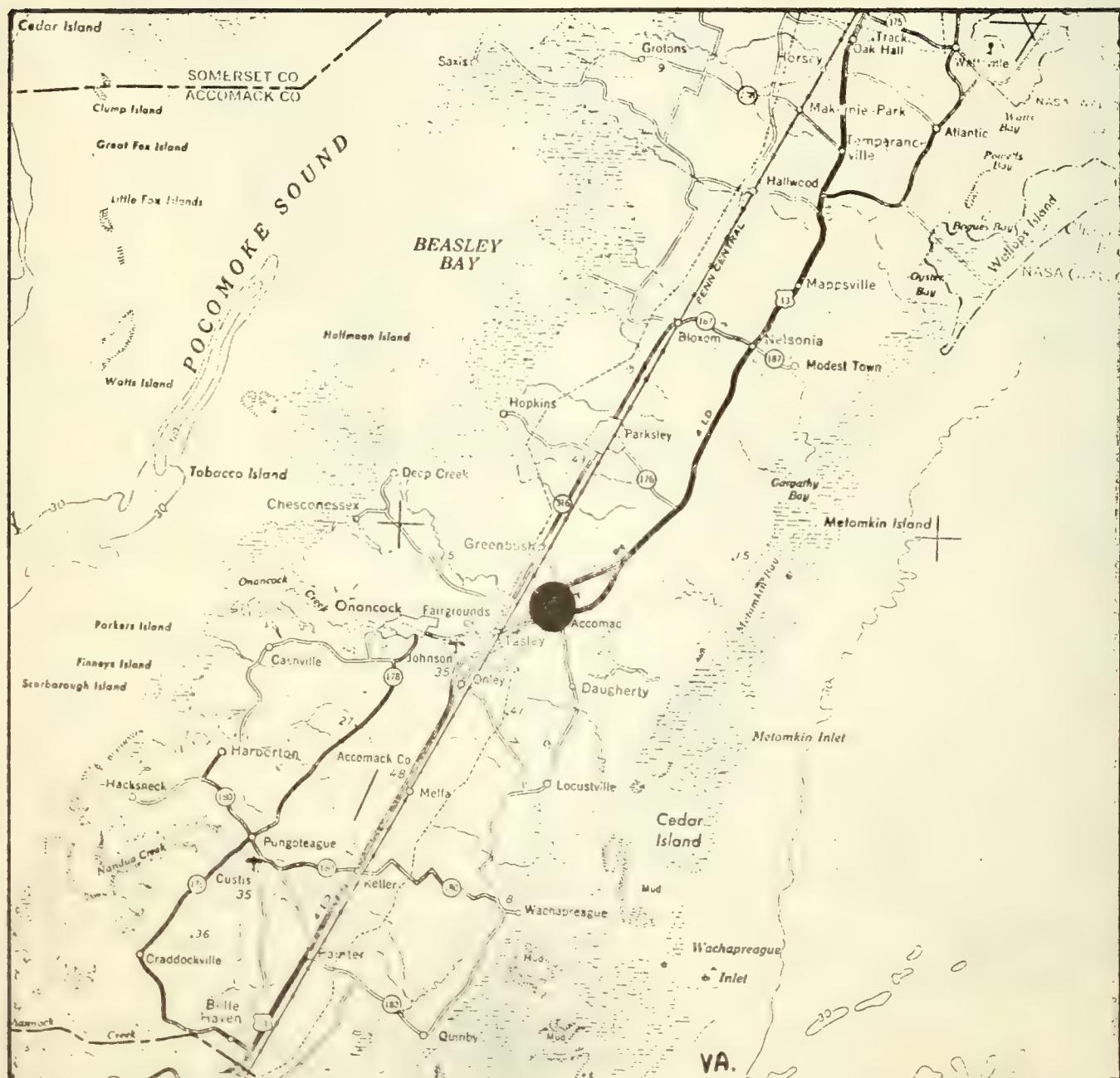
Habit: Herb

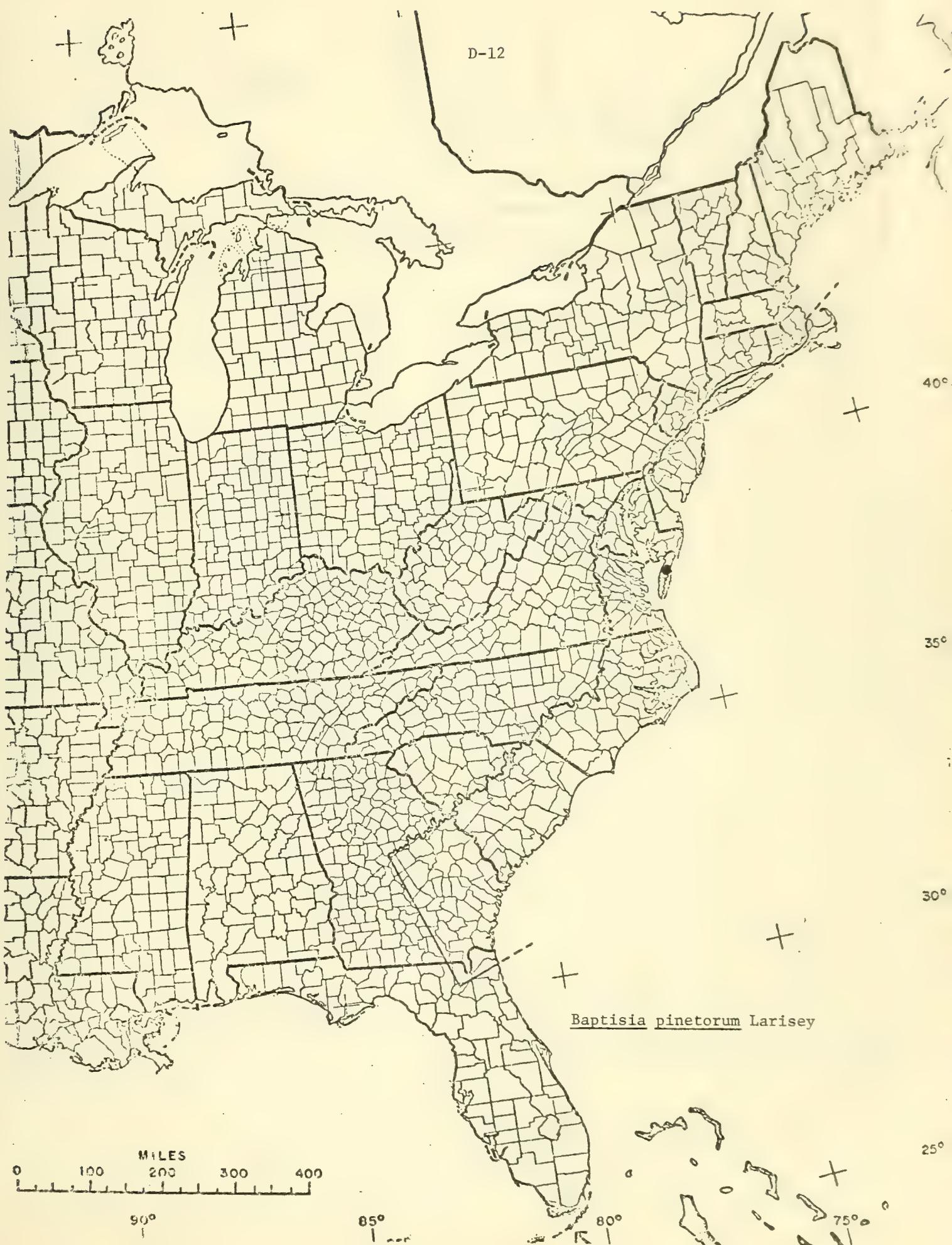
Habitat: Open woods and clearings

Range: Accomac Co., Virginia

Status: Very rare, endemic and probably endangered.

Reference: Dr. Clyde Reed, Reed Herbarium, Baltimore, Maryland.





GRAMINEAE

Calamovilfa brevipilis var. calvipes Fern.

Habit: Herb

Habitat: Wet areas and sphagnum bogs

Range: Southeastern Virginia; Greensville and Brunswick Counties, Virginia.

Status: Very Rare

Reference: A.B. Massey, Virginia Flora, 1961.



Cassia fasciculata var. macrosperma Fern, Partridge-Pea

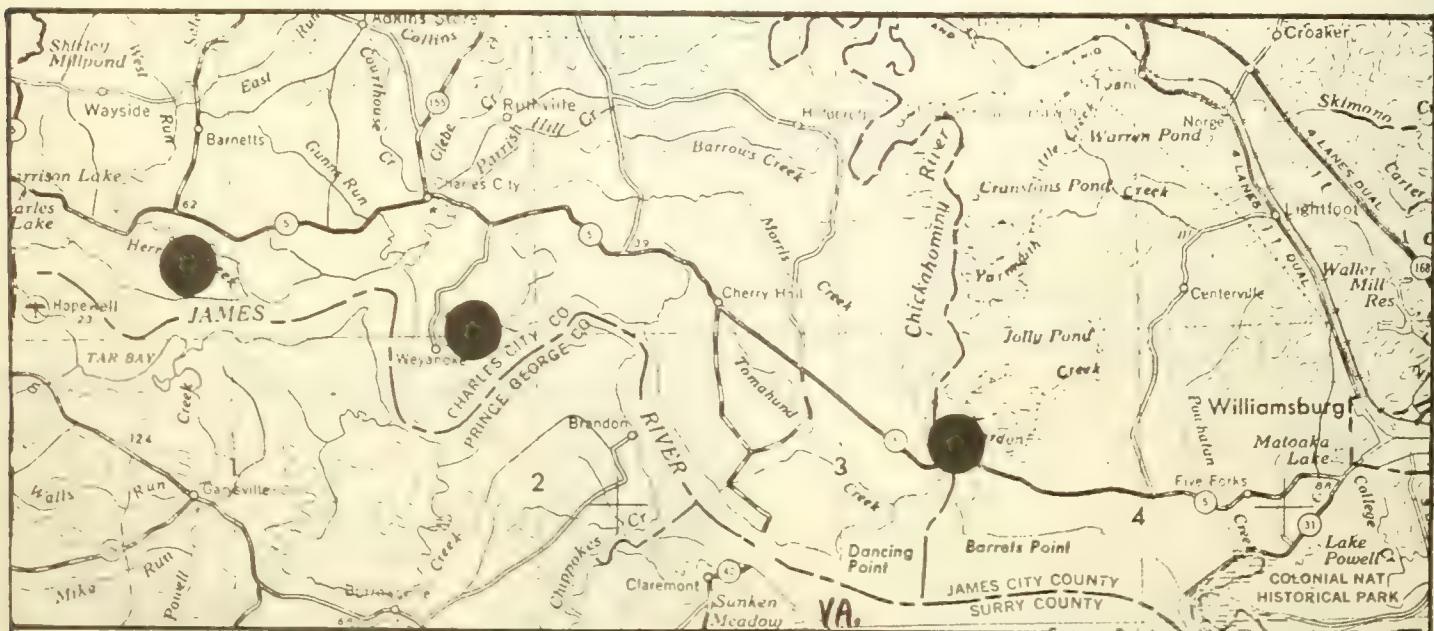
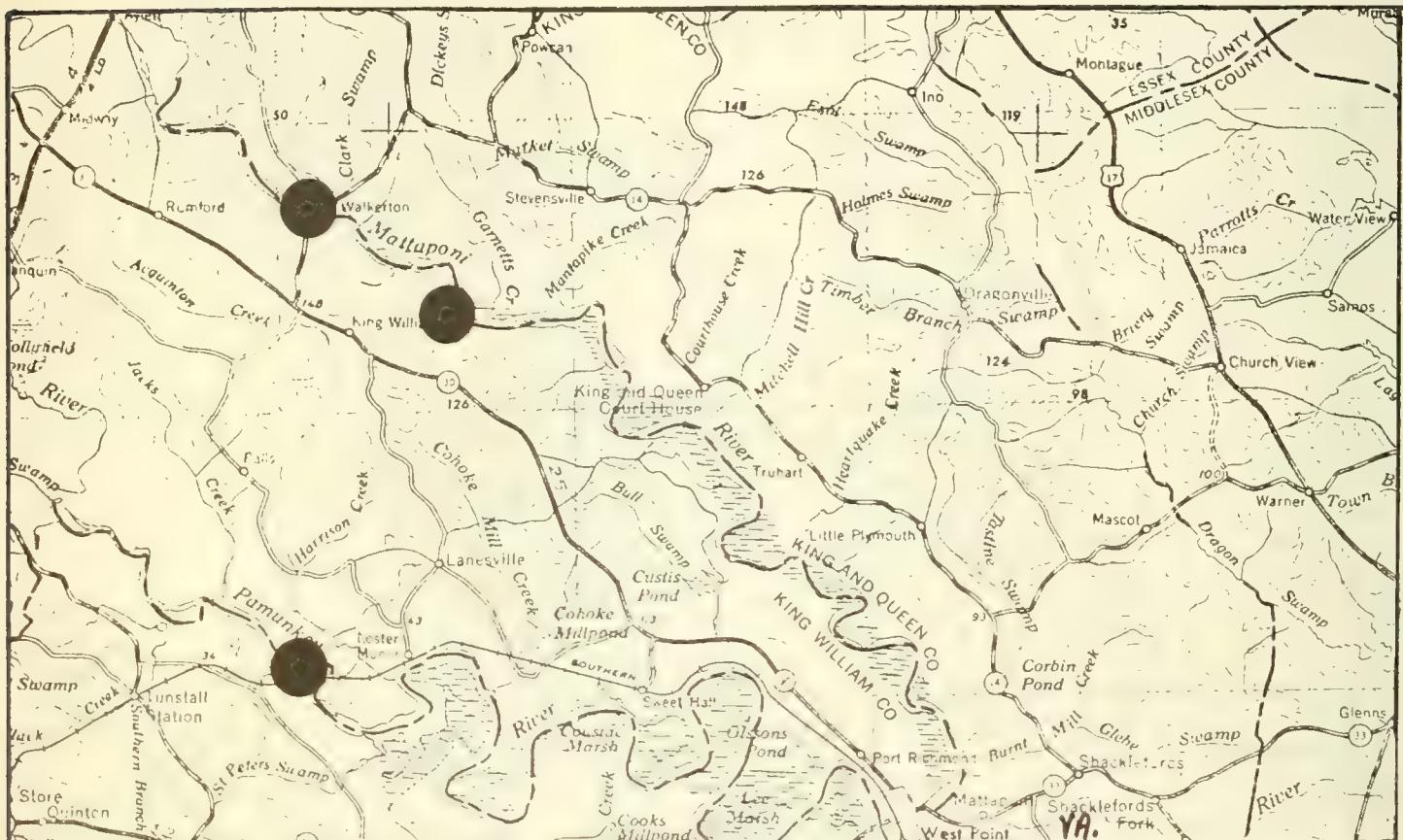
Habit: Herb

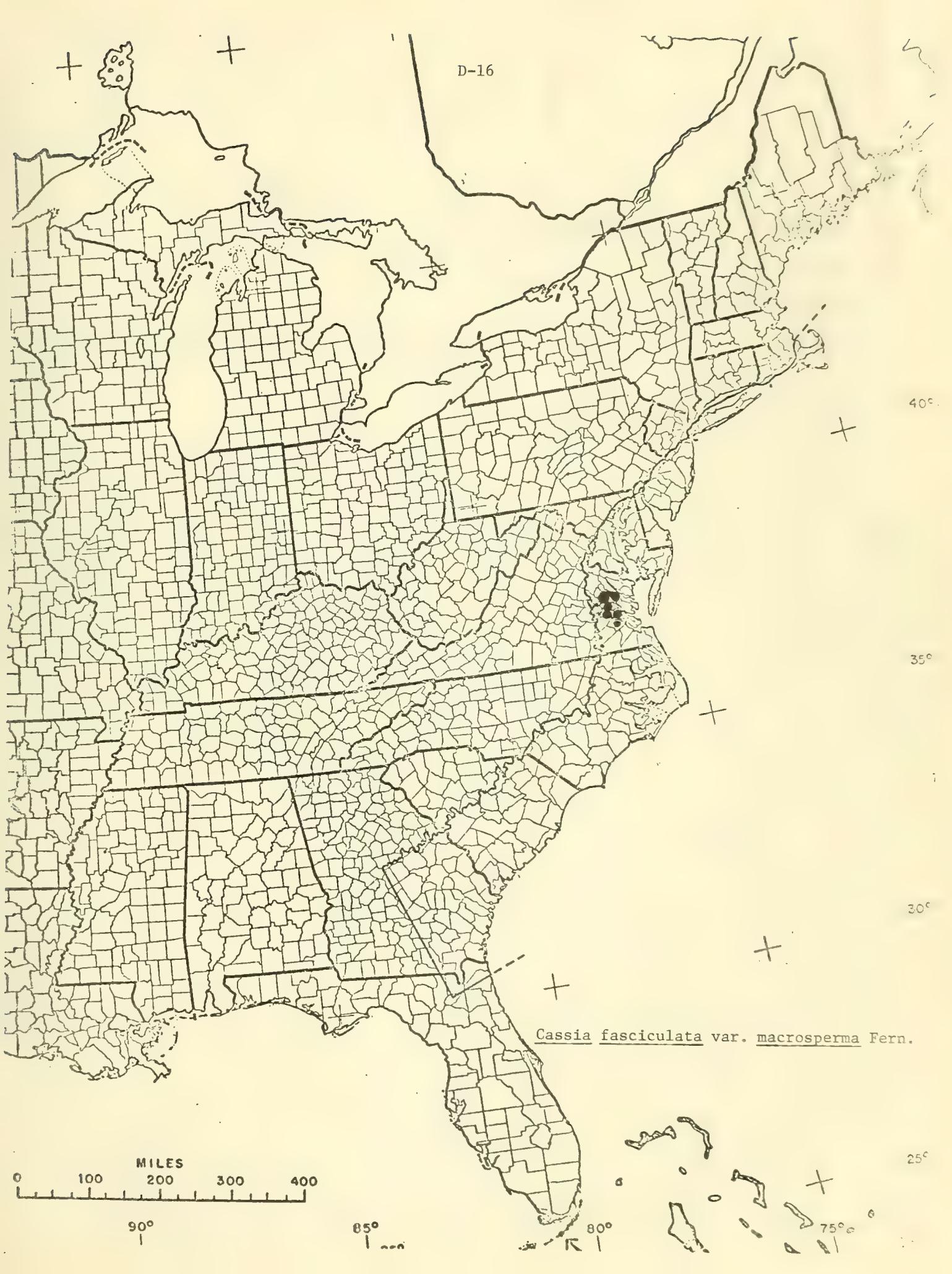
Habitat: Tidal marshes

Range: Eastern Virginia; Charles City, James City, New Kent, King William and King & Queen Cos., Virginia

Status: Endemic

Reference: M.L. Fernald, Rhodora, Vol. 42, p.455, November, 1940.





RUBIACEAE

Diodia teres var. hystricina Fern. & Grisc. Buttonweed

Habit: Herb

Habitat: Dry sands

Range: Coastal Virginia; Essex, Princess Anne and Northampton Counties, Virginia.

Status: Endemic

Reference: U.S. National Herbarium



MILES

0 100 200 300 400

90°

85°

80°

75°

25°

Eupatorium saltuense Fern.

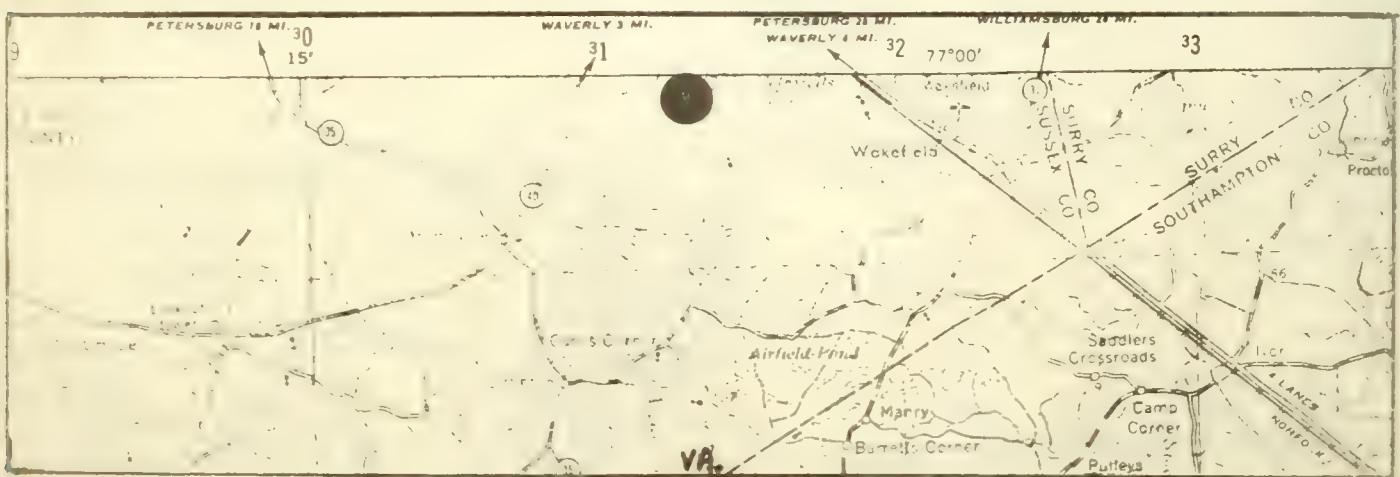
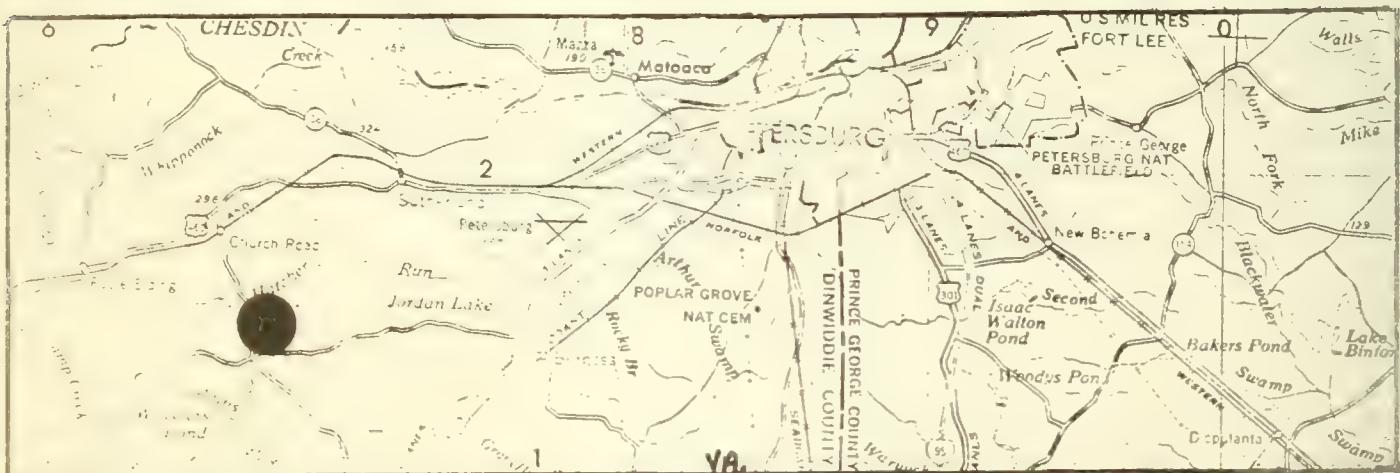
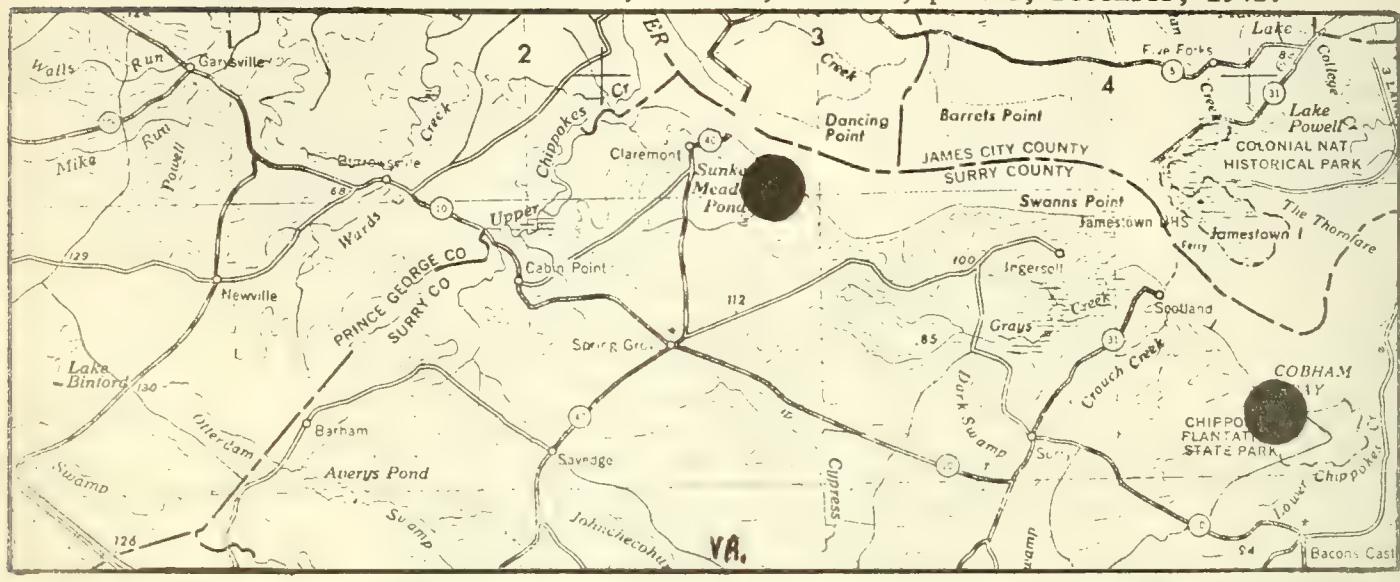
Habit: Herb

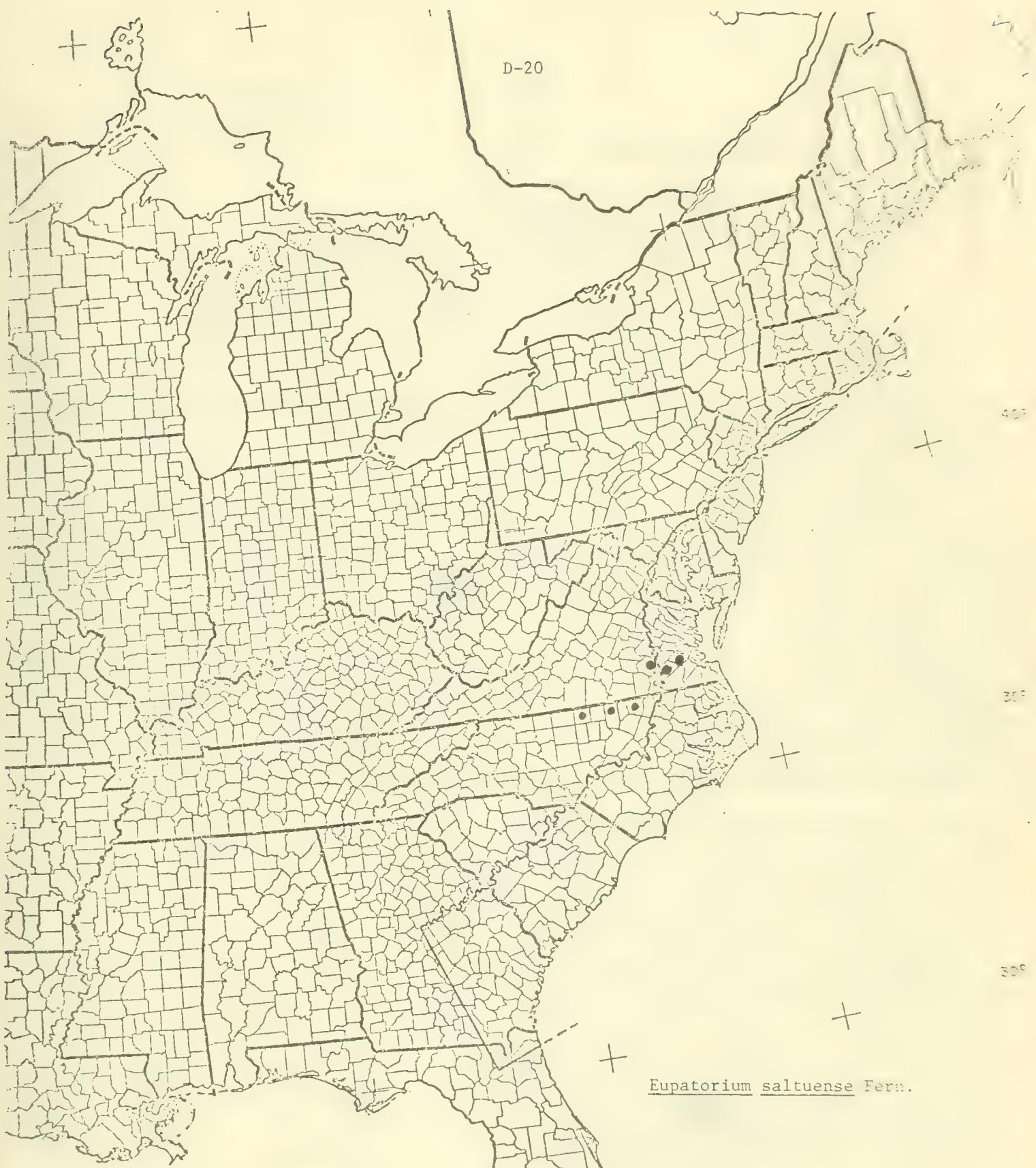
Habitat: Rich woods, thickets and clearings

Range: Southeastern Virginia; Surry, Sussex and Dinwiddie Cos., Virginia

Status: Endemic and rare

Reference: M.L. Fernald, Rhodora, Vol. 44, p. 461, December, 1942.





0 100 200 300 400 MILES

90°

65°

80°

25°

75°

Gaylussacia brachycera (Michx.) Gray**Box Huckleberry**

Habit: Evergreen, low shrub

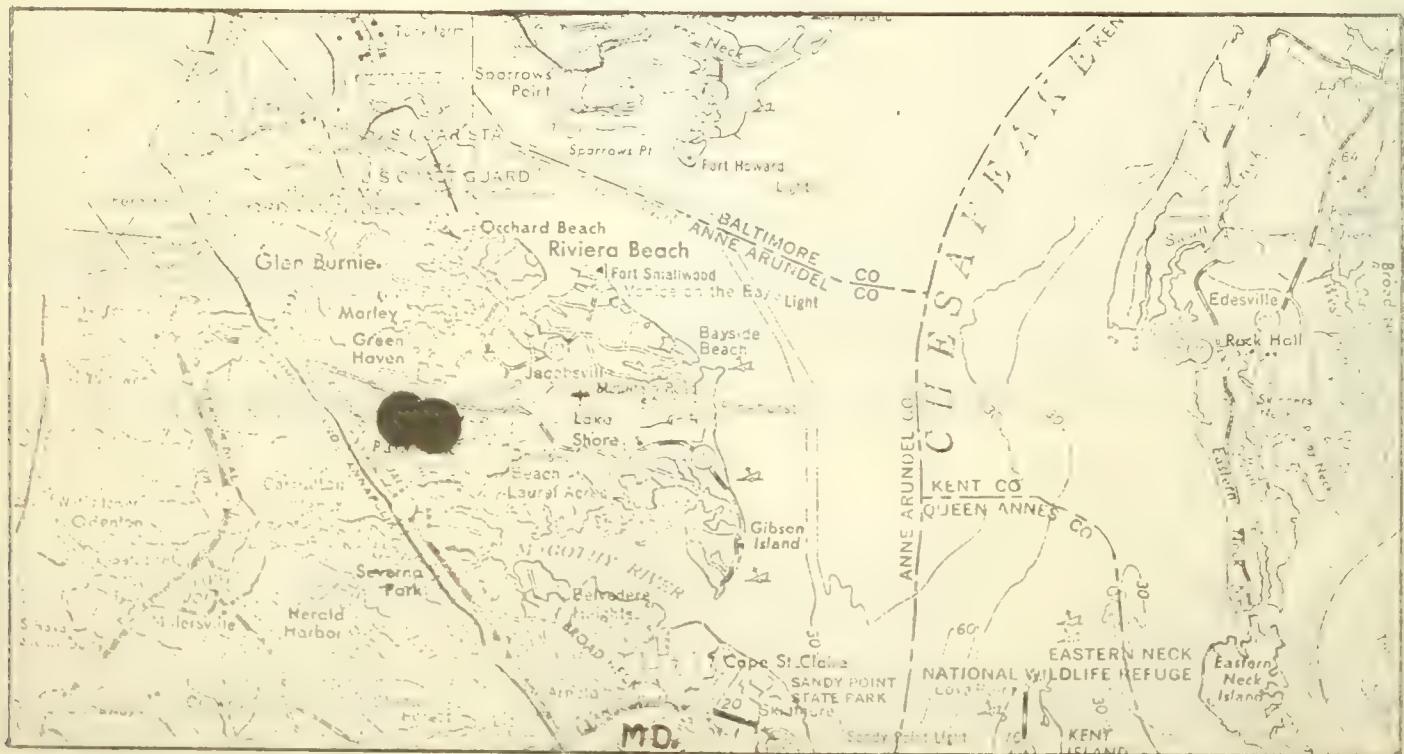
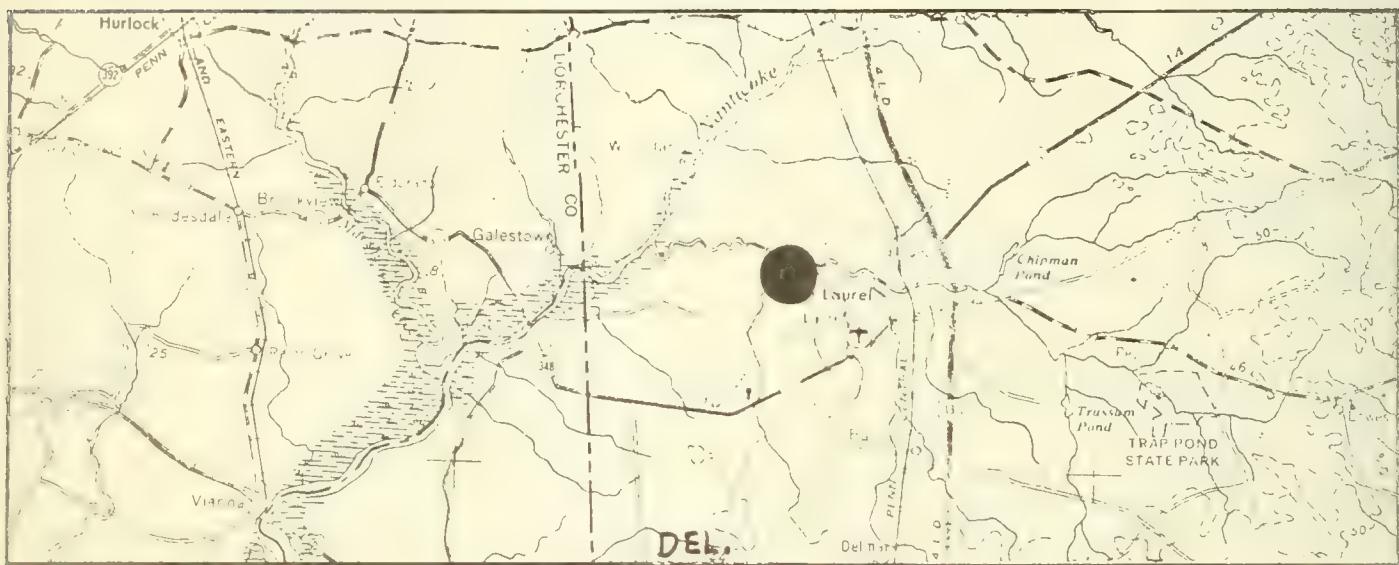
Habitat: Sandy woods and slopes

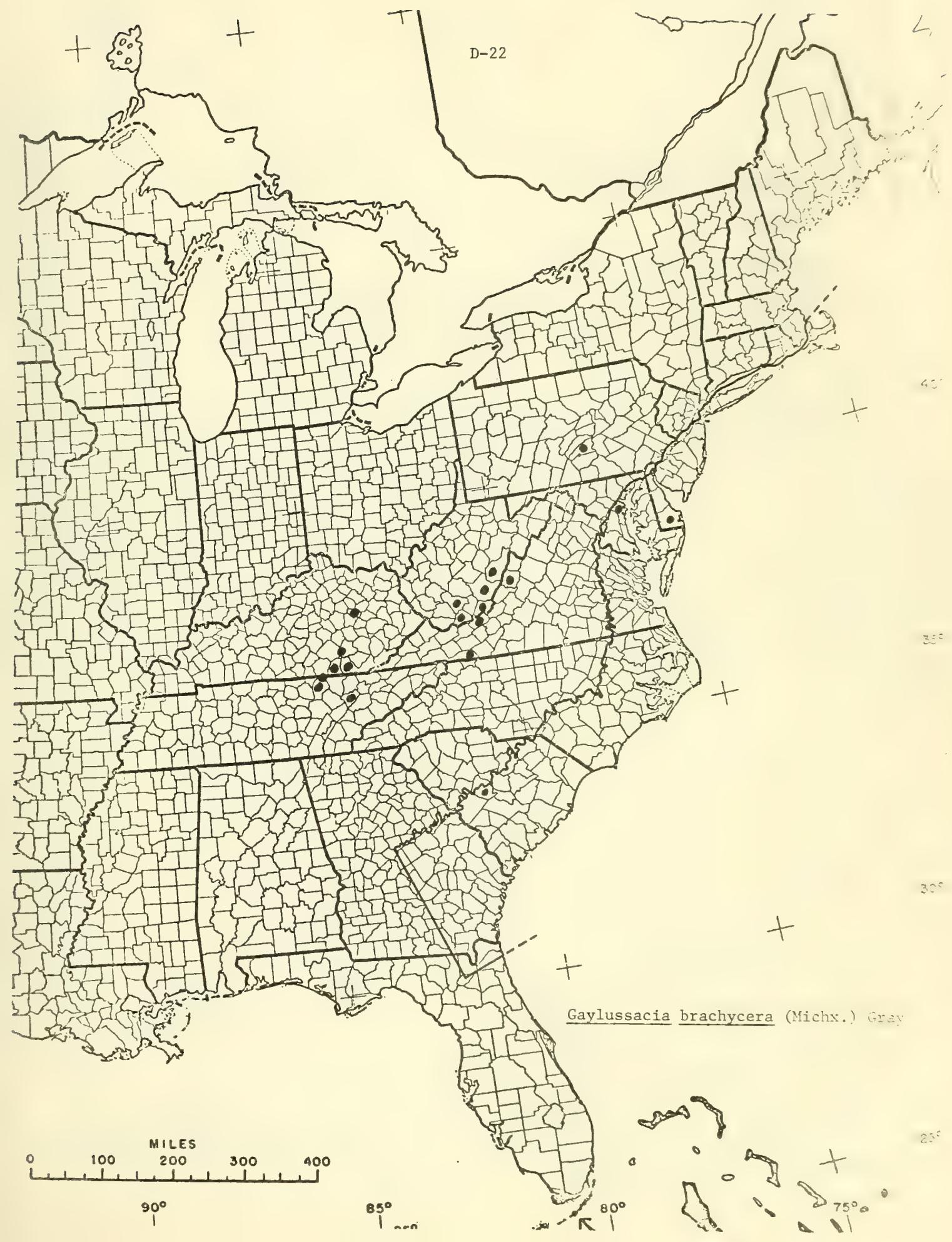
Range: Maryland and Delaware to Pennsylvania and Kentucky and eastern Tennessee; very local except in W. Virginia; Sussex Co., Delaware and Anne Arundel Co., Maryland.

Status: Rare in areas outside of West Virginia but of special interest because it is possibly the oldest living plant.

Reference: H. N. Moldenke, Wildflower, Vol. 33, pp. 4-8, January, 1957.

U.S. National Herbarium.





JUNCACEAE

Juncus caesariensis Coville.

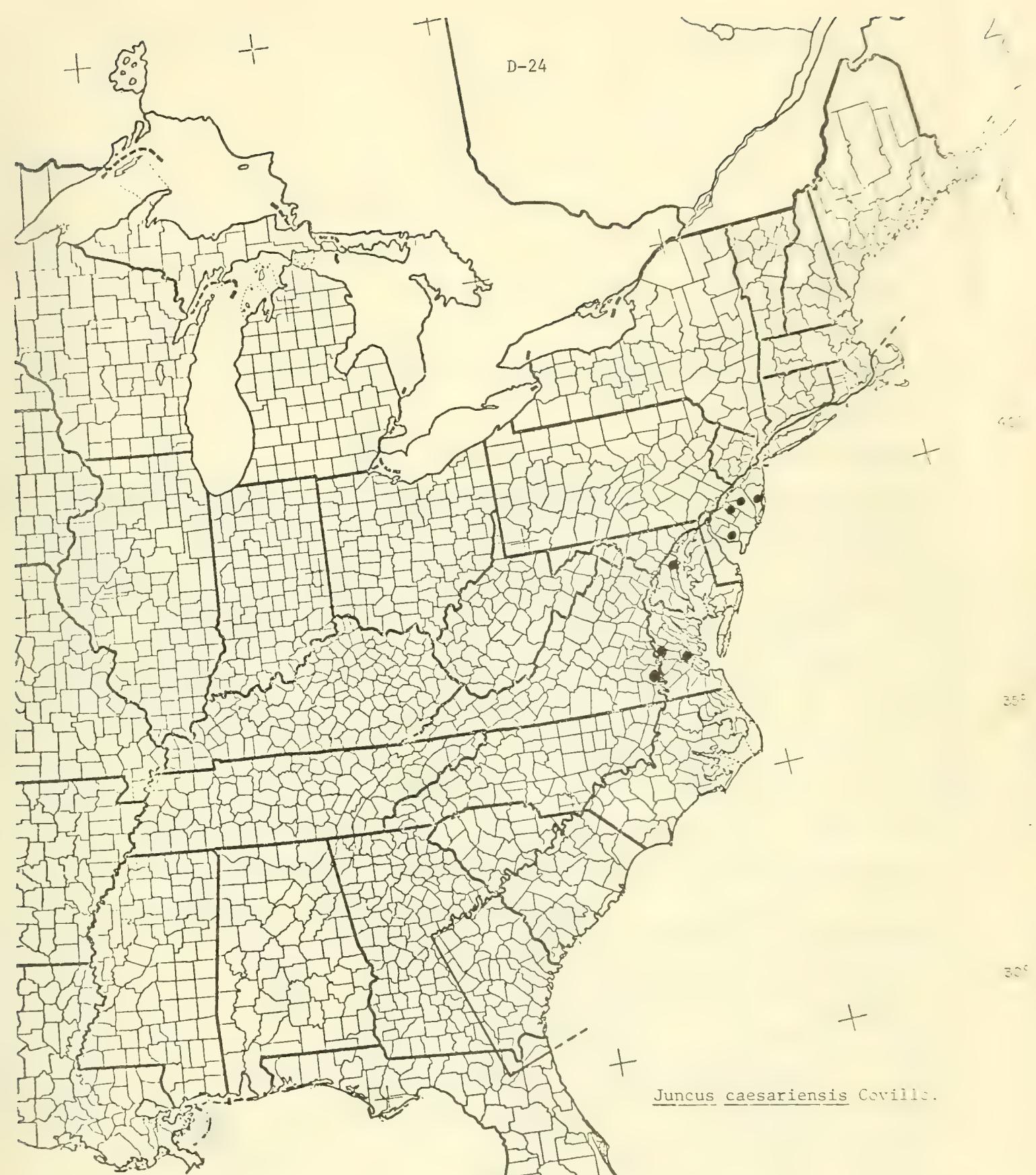
Habit: Herb

Habitat: Wet peaty places

Range: New Jersey; Southeastern Virginia; Glen Burnie, Anne Arundel Co., Maryland; Elko Station, Henrico, Burgers Station, Dinwiddie, and James City Counties, 3 miles West of Williamsburg, Virginia.

Status: Local. Rare.

Reference: U. S. National Herbarium
Gray Herbarium
A. B. Massey, Virginia Flora, 1961



Juncus caesariensis Coville.

MILES
0 100 200 300 400

90°

85°

80°

75°

JUNCACEAE

Juncus griscomi Fern.

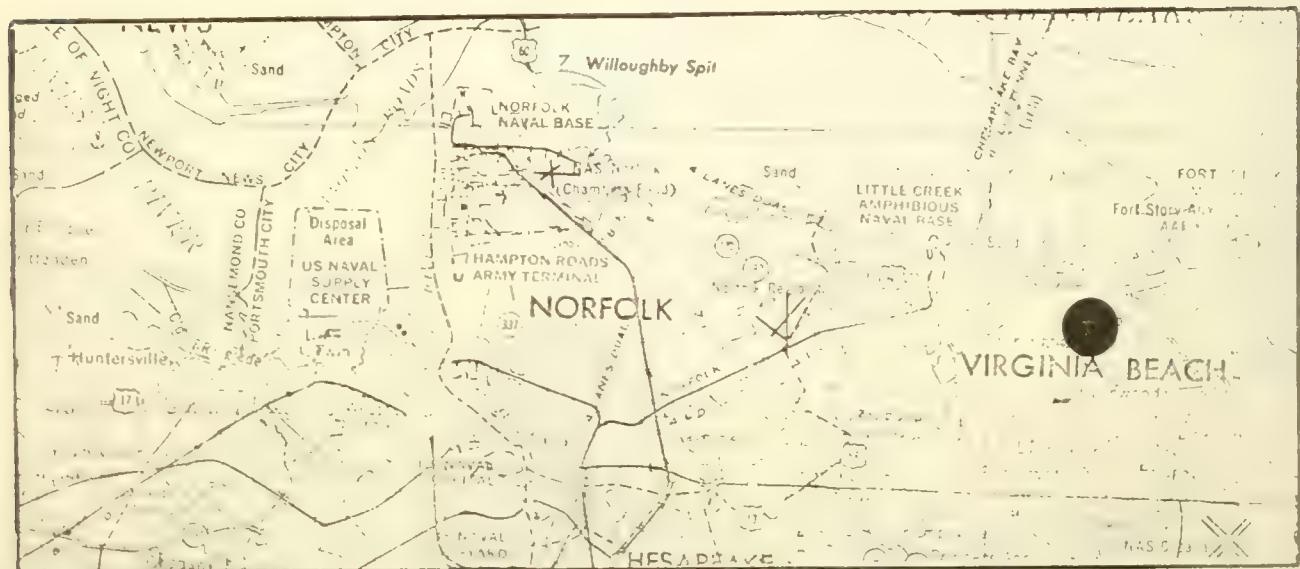
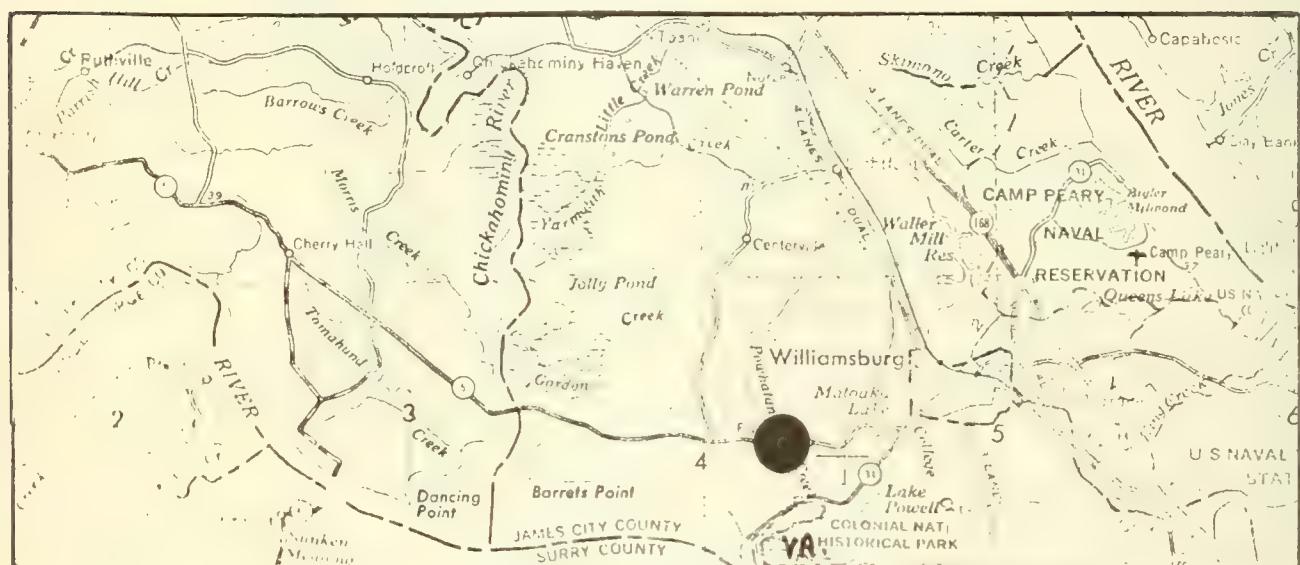
Habit: Herb

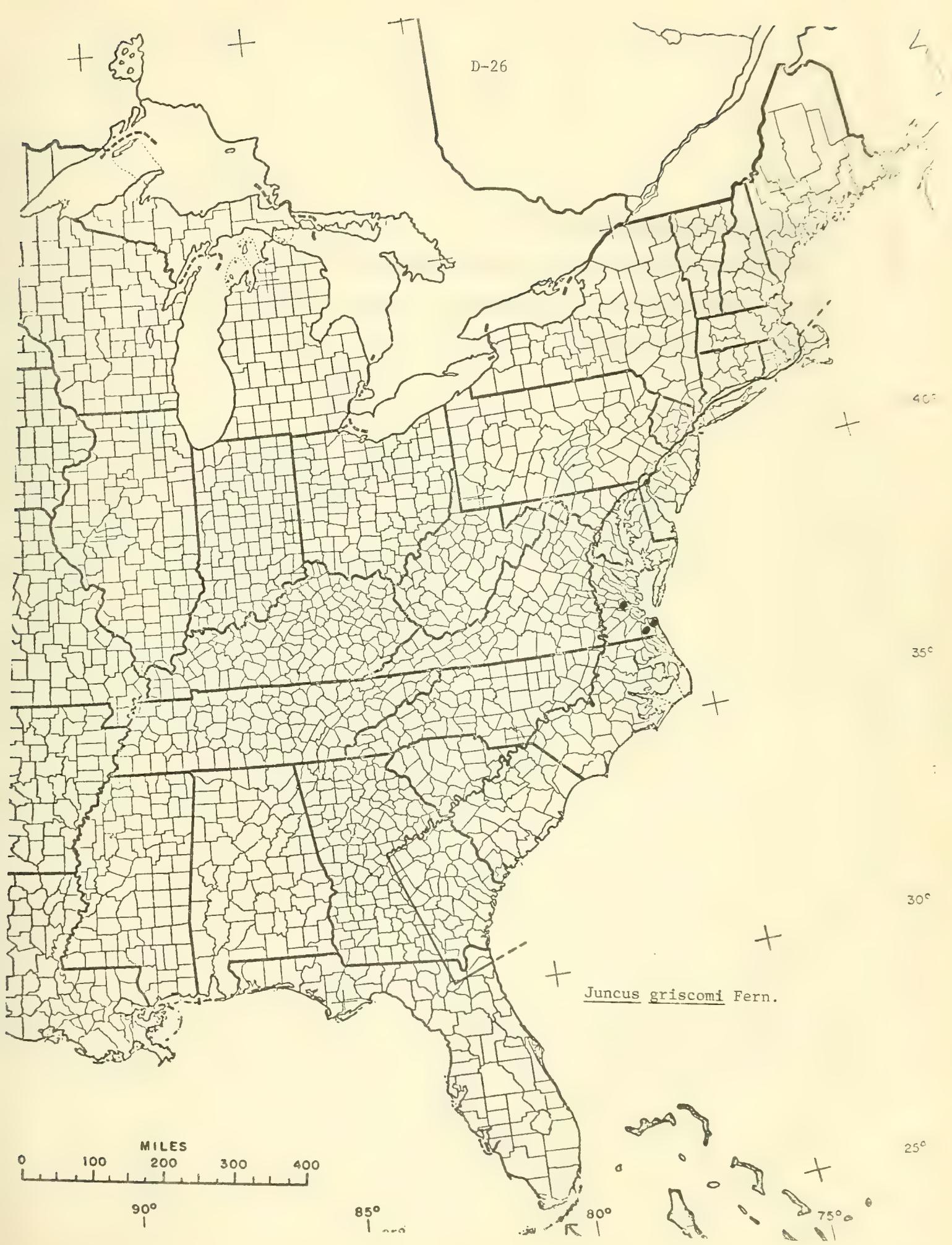
Habitat: Wet woodlands

Range: Princess Anne, James City and Norfolk Counties, Virginia.

Status: Endemic and rare.

Reference: M.L. Fernald, Rhodora 38: 401, Nov., 1936.
U.S. National Herbarium





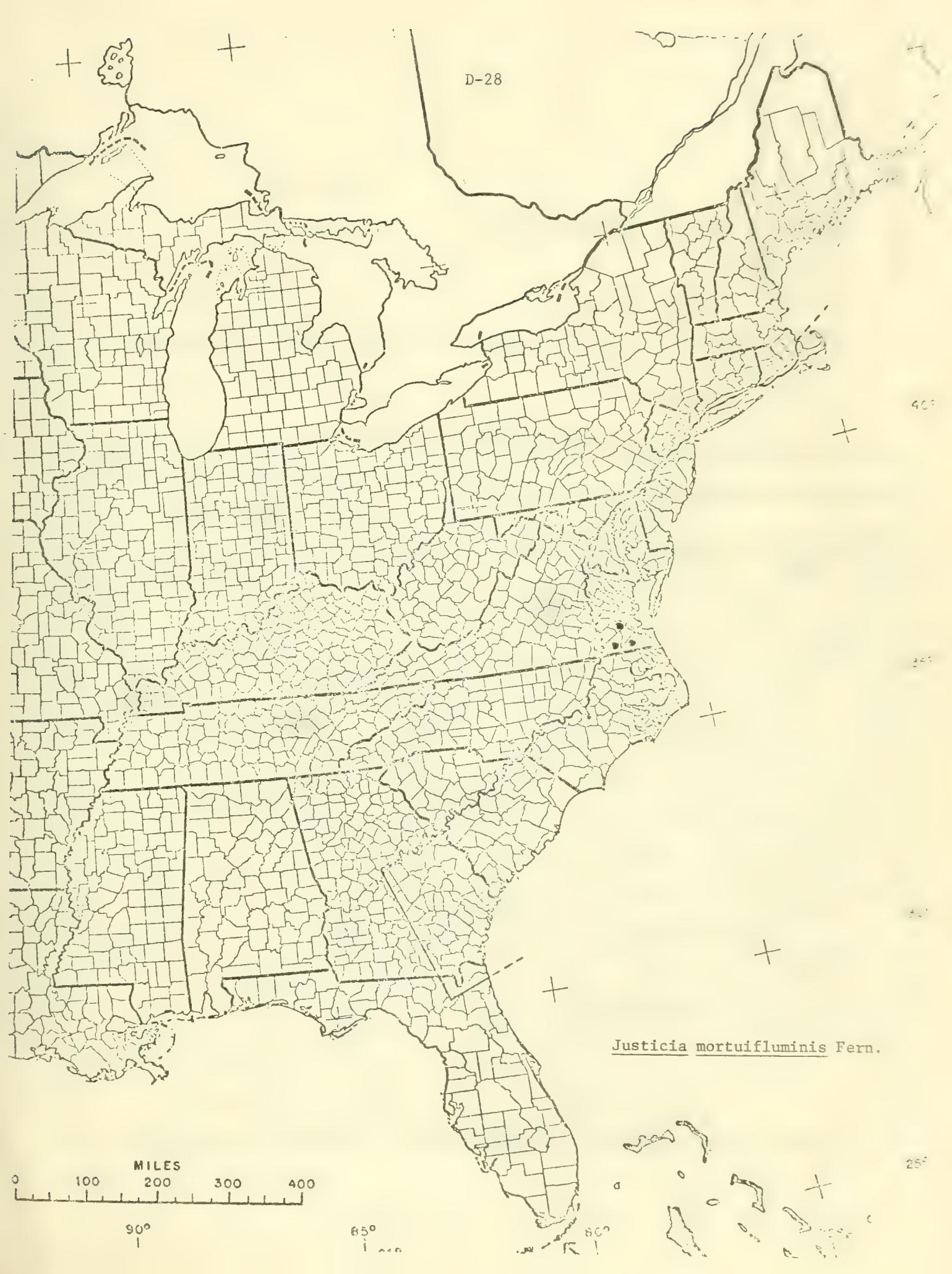
ACANTHACEAE

Justicia mortuifluminis Fern.

Habitat: Wooded bottomlands and shaded margins of quiet water.

Range: Southhampton, Surry, Nansemond counties, Virginia.

Status: Endemic and rare.



CISTACEAE

Lechea maritima var. virginica Hodgdon

Pinweed

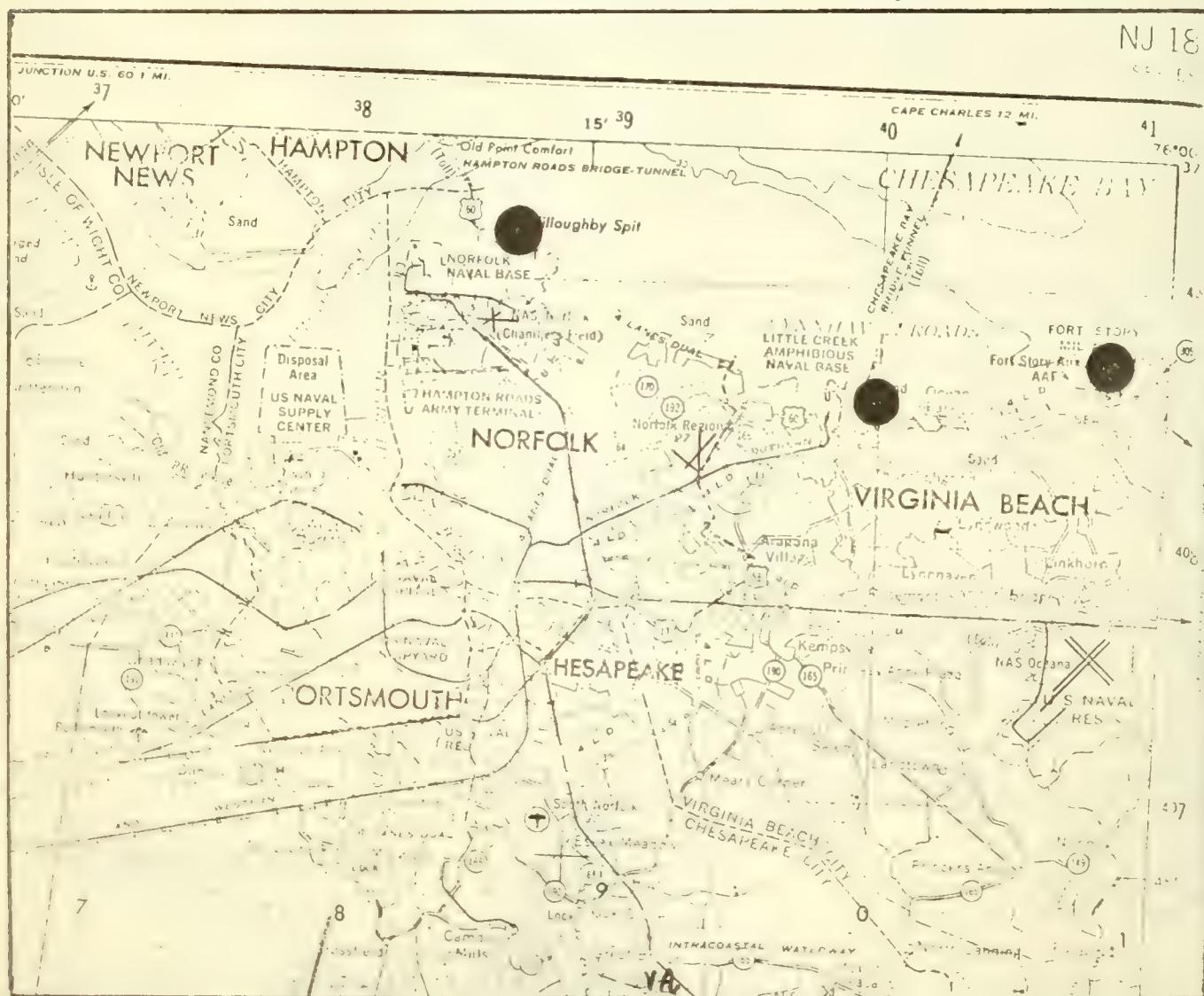
Habit: Herb

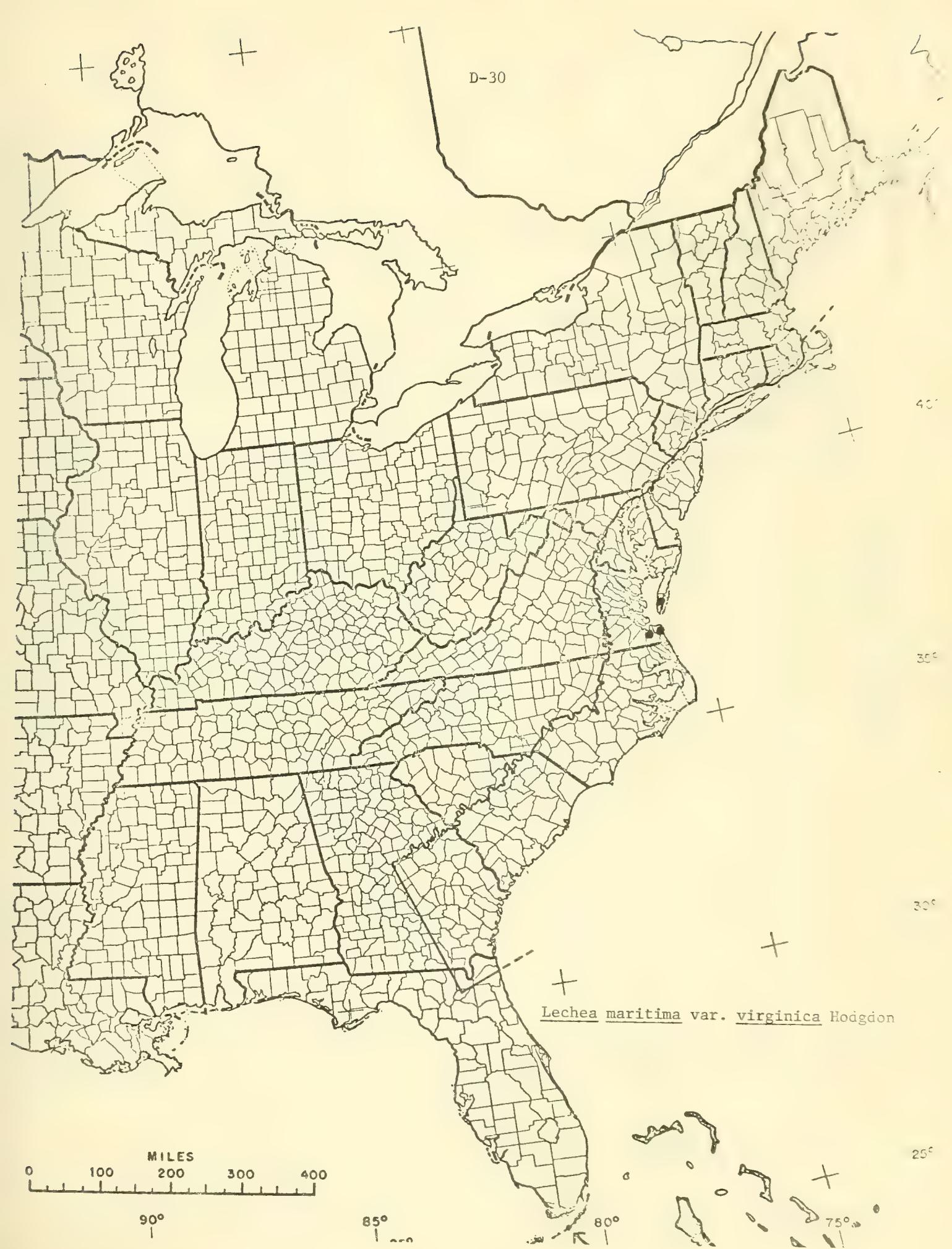
Habitat: Dunes and open sand flats

Range: Southeastern Virginia: Virginia Beach City, Norfolk and Northampton Counties, Virginia.

Status: Endemic and rare

Reference: Dr. Clyde Reed, Reed Herbarium, Baltimore, Maryland





UMBELLIFERAE

Oxypolis canbyi (Coulter & Rose) Fern.

Parsley Family

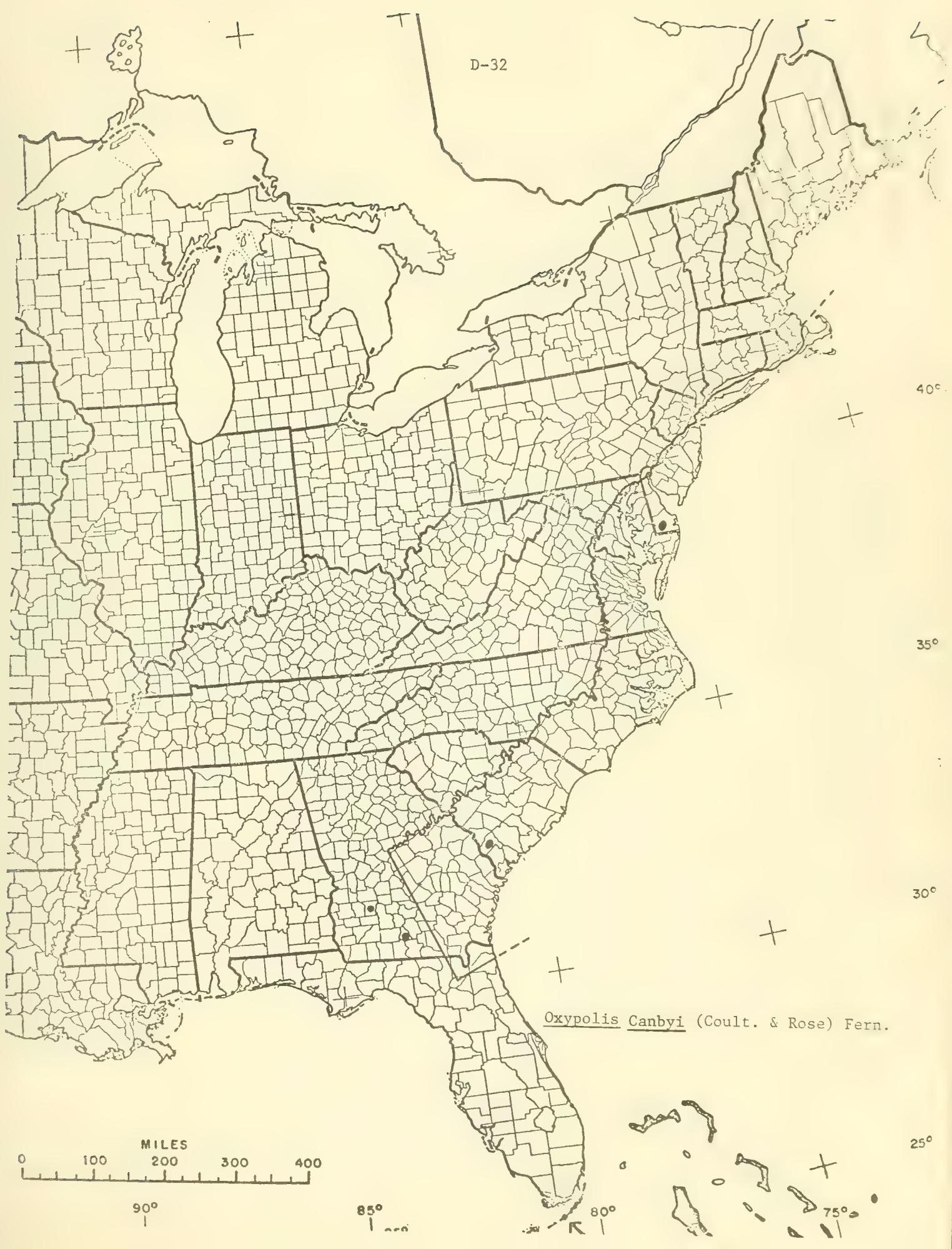
Habit: Herb

Habitat: Meadows and bogs

Range: Hampton Co., South Carolina and Cooke Co., Lee Co.,
Georgia; Ellendale in Sussex Co., Bloomington, Delaware.

Status: Local, perhaps extinct.

References: National Herbarium
Gray Herbarium



GRAMINEAE

Panicum aculeatum Hitchc. & Chase

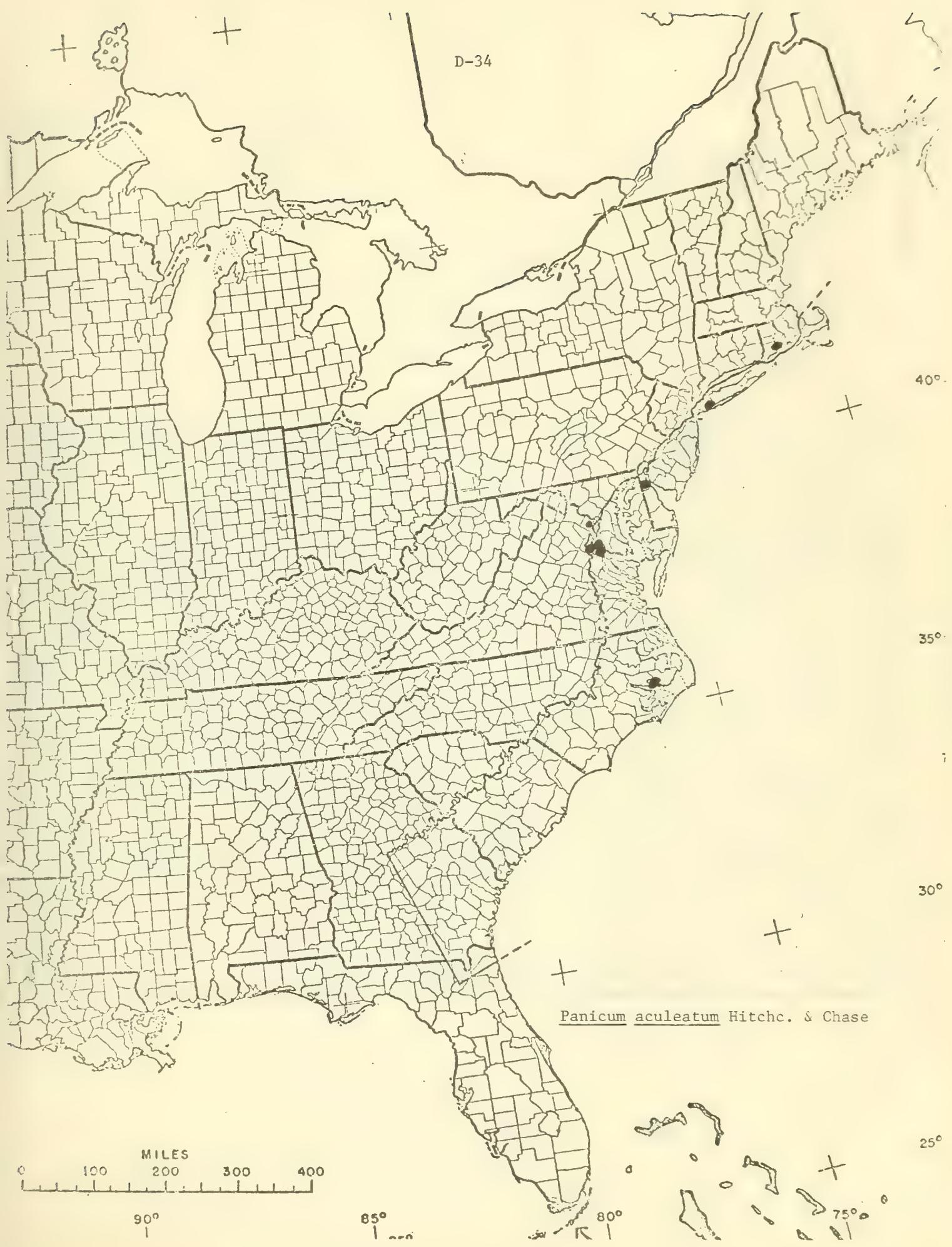
Habit: Herb

Habitat: Moist to wet woods

Range: Connecticut, Eastern New York to North Carolina; District of Columbia and Arlington and Fairfax Counties, Virginia.

Status: Rare and little known.

References: Rhodora 8:209. 1906.



GRAMINEAE

Panicum mundum Fern.

Panic grass

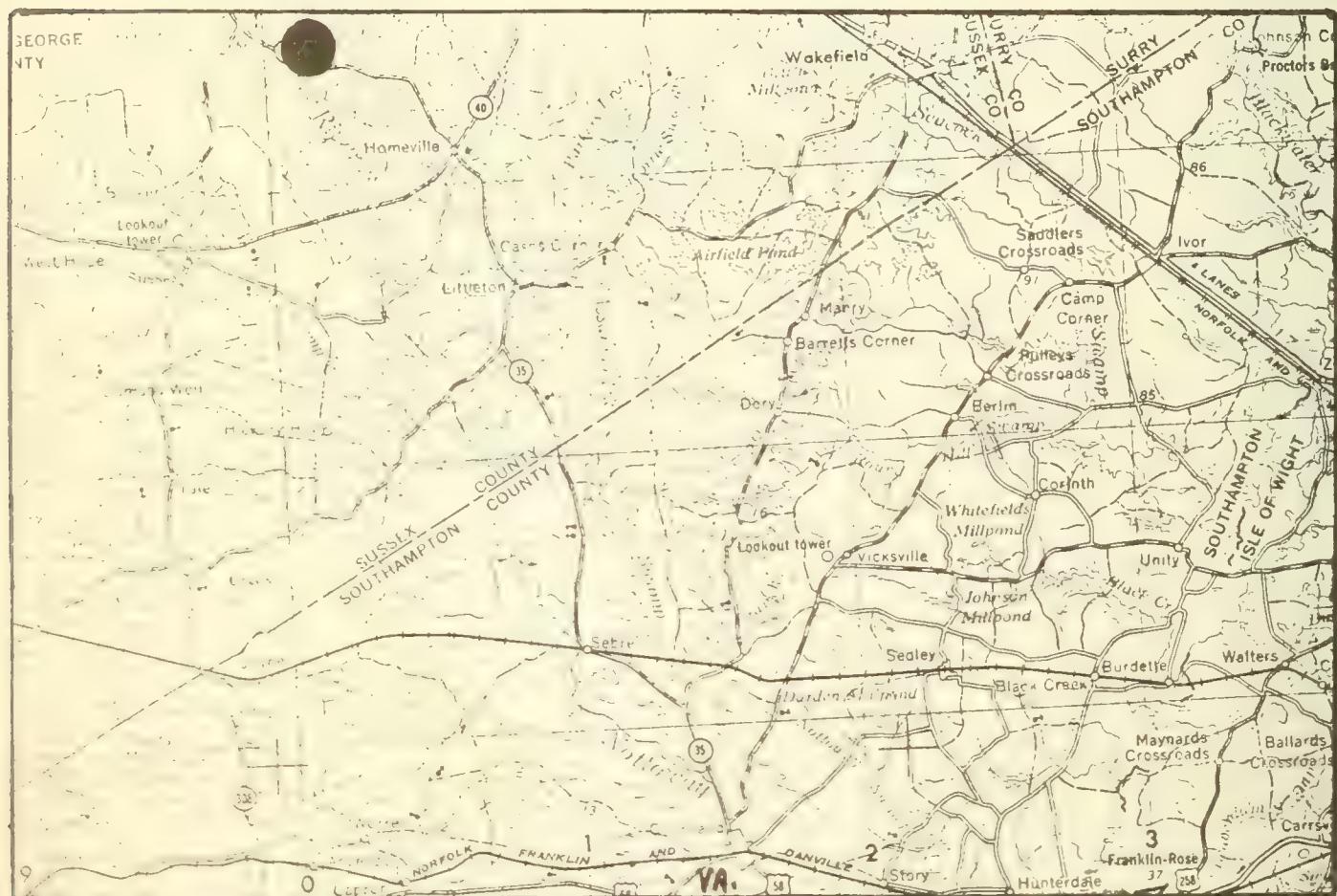
Habit: Herb

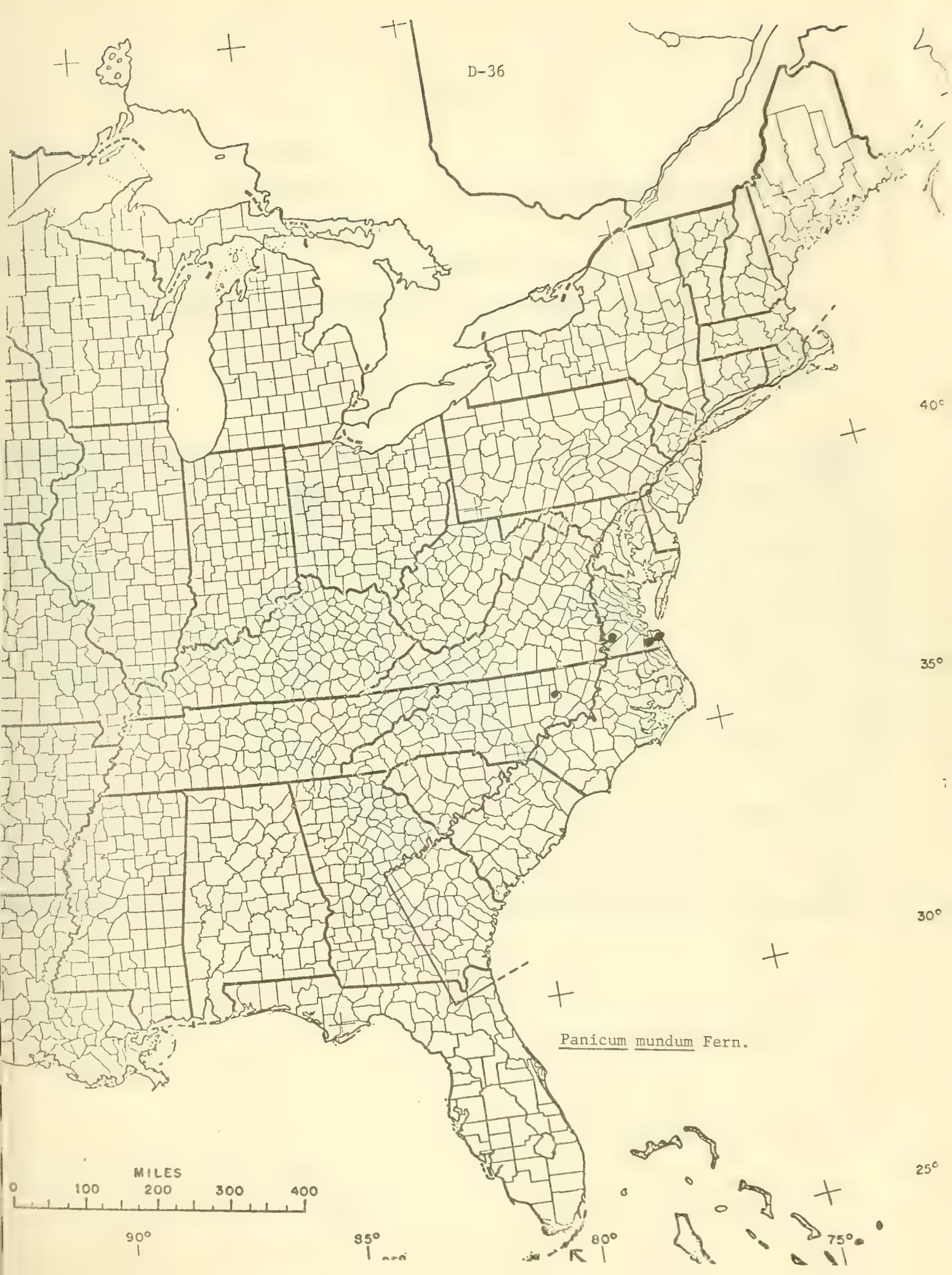
Habitat: Peaty soil

Range: Southeastern Virginia; Sussex, Princess Anne and Norfolk Counties, Virginia.

Status: Endemic and rare, possibly endangered.

Reference: M.L. Fernald, Rhodora, Vol. 38, p. 392, November, 1936.





LAMIACEAE

Pycnanthemum monotrichum Fern.

Mountain mint

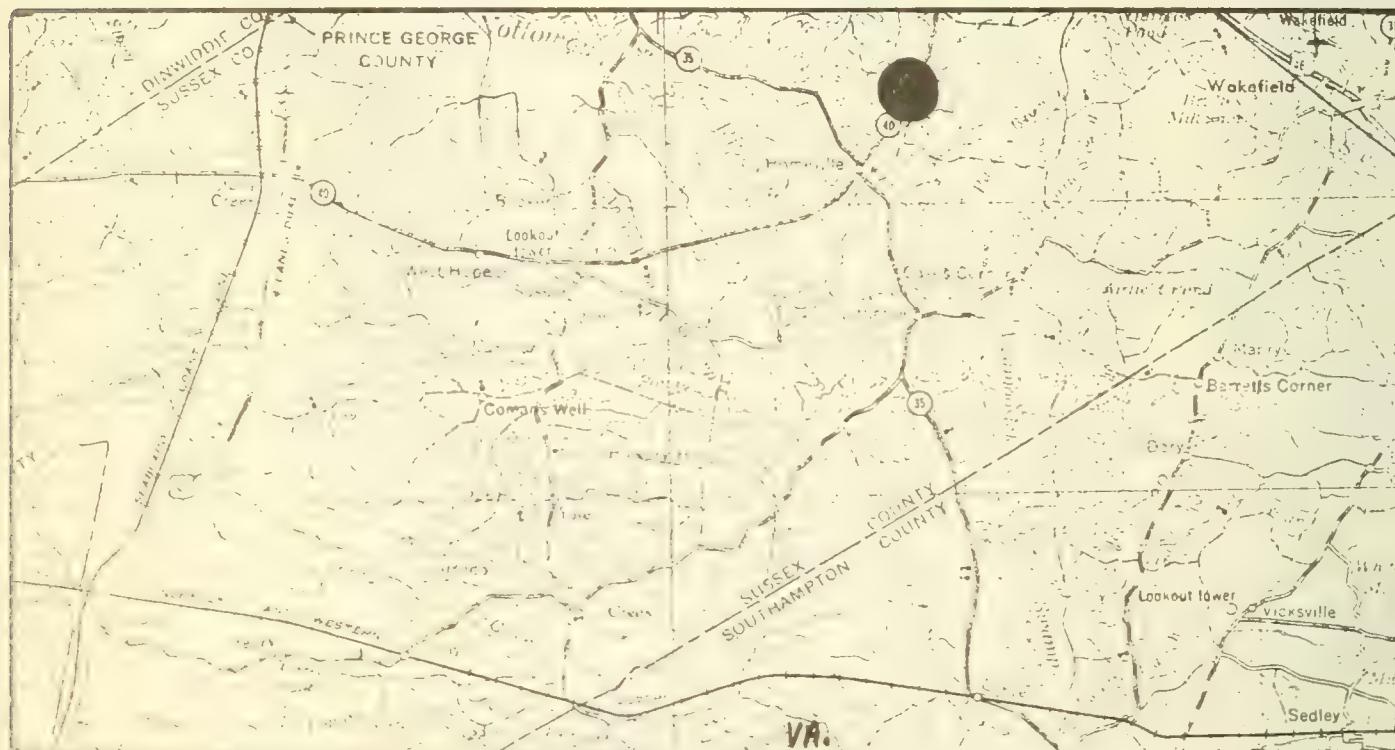
Habit: Herb

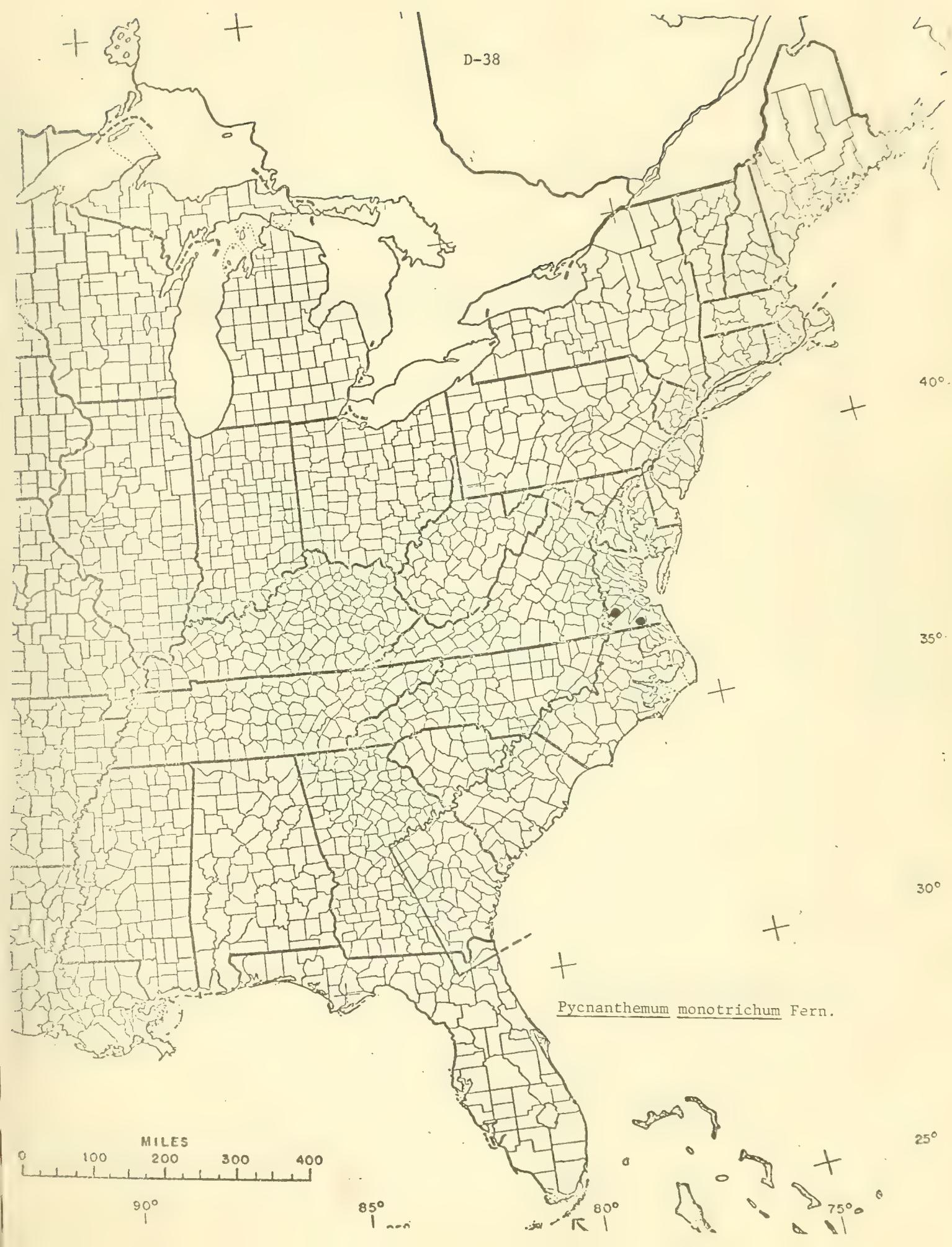
Habitat: Dry sandy woods and clearings

Range: Southeastern Virginia; Sussex and Nansemond Counties, Virginia.

Status: Endemic and rare

References: M.L. Fernald, Rhodora, Vol. 47, p. 176, May, 1945.





DIAPENSIACEAE

Pyxidanthera brevifolia Wells

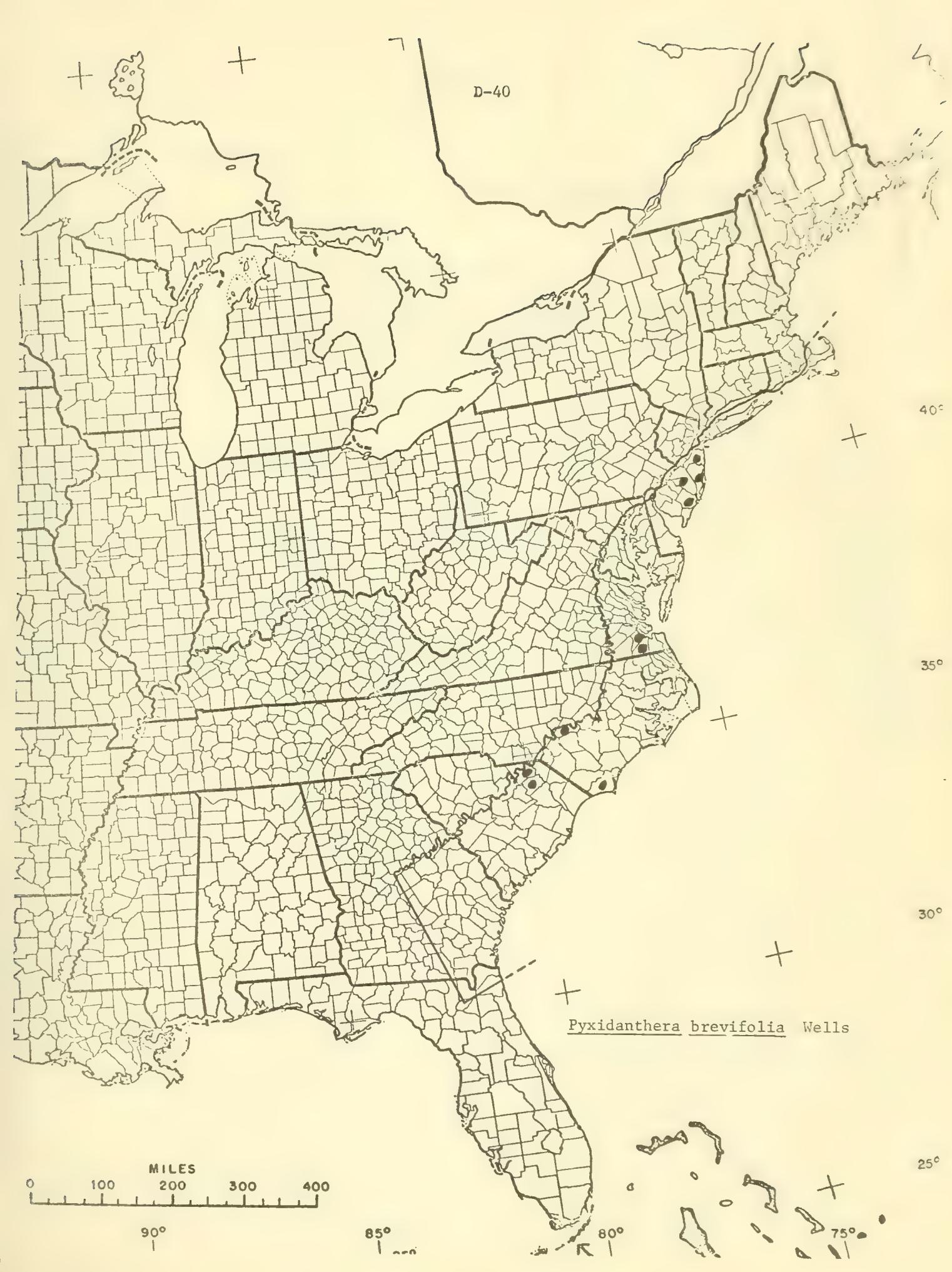
Flowering moss; pyxie

Habit: Herb

Habitat: Sandy pine barrens

Range: Burlington, New Jersey; Ocean, Monmouth and Atlantic Cos., South Carolina; Nansemond, and South of Zuni and South of Lee's Mill, Isle of Wight Counties, Virginia.

References: Gray Herbarium
A. B. Massey, Virginia Flora, 1961.



COMPOSITAE

Rudbeckia heliopsisidis T. & G.

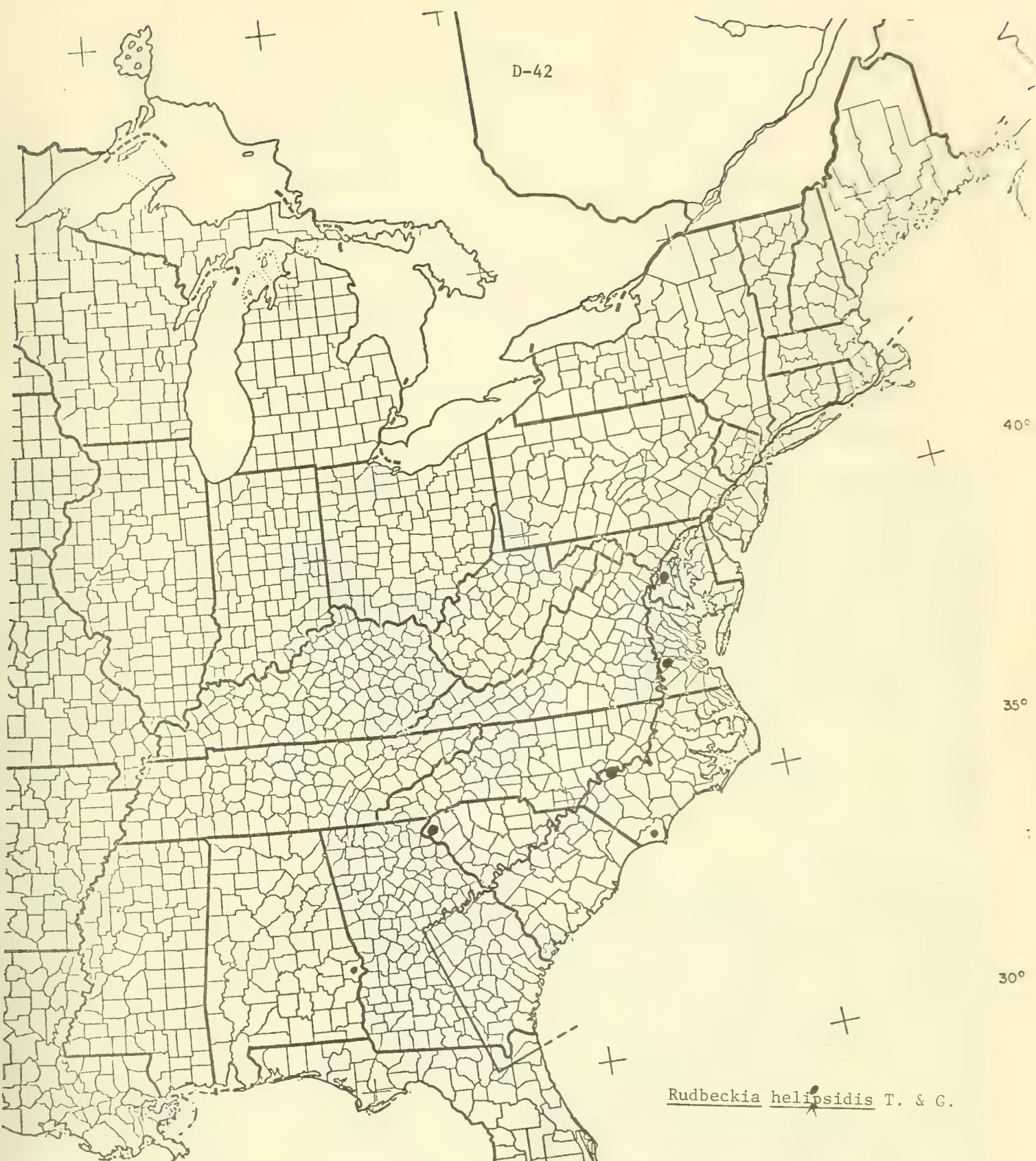
Habit: Herb

Habitat: Dry woods - pine and oak woods and thickets.

Range: Southeastern Virginia, Georgia and Alabama; 2 to 3 miles North of Disputanta, Prince George County, Virginia; South Carolina and North Carolina.

Status: Very local; rare.

Reference: National Herbarium
North Carolina State University Herbarium



Rudbeckia helipsidis T. & G.

MILES
0 100 200 300 400

90°

85°

80°

75°

25°

SCROPHULARIACEAE

Schwalbea americana L.

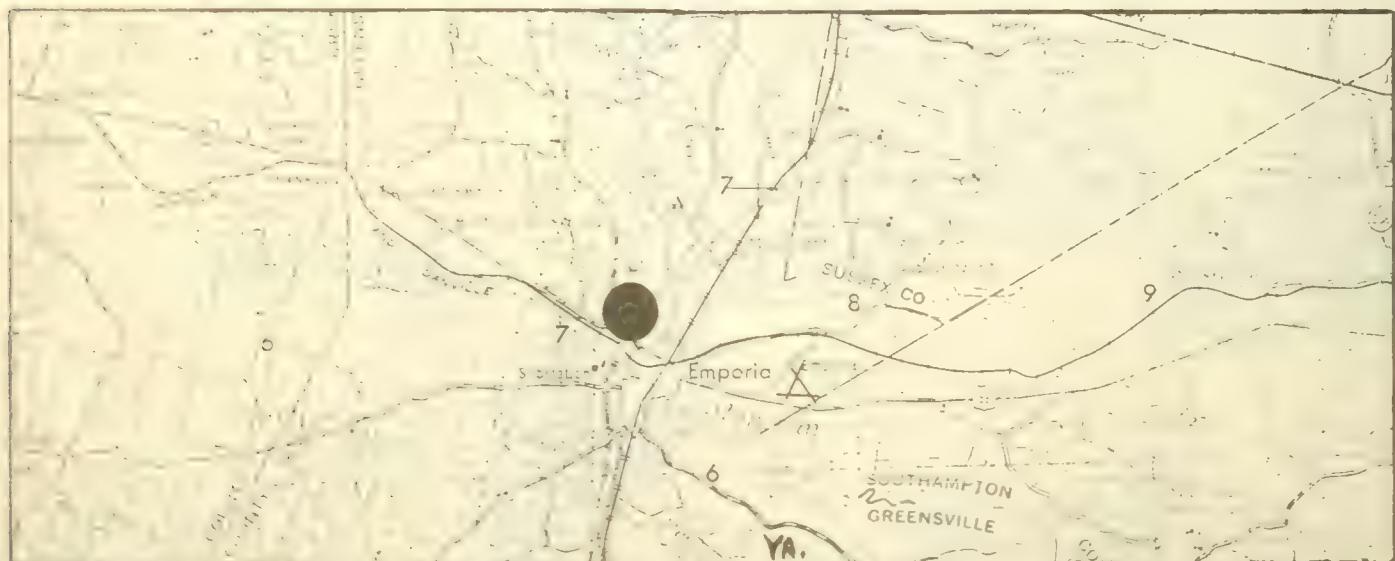
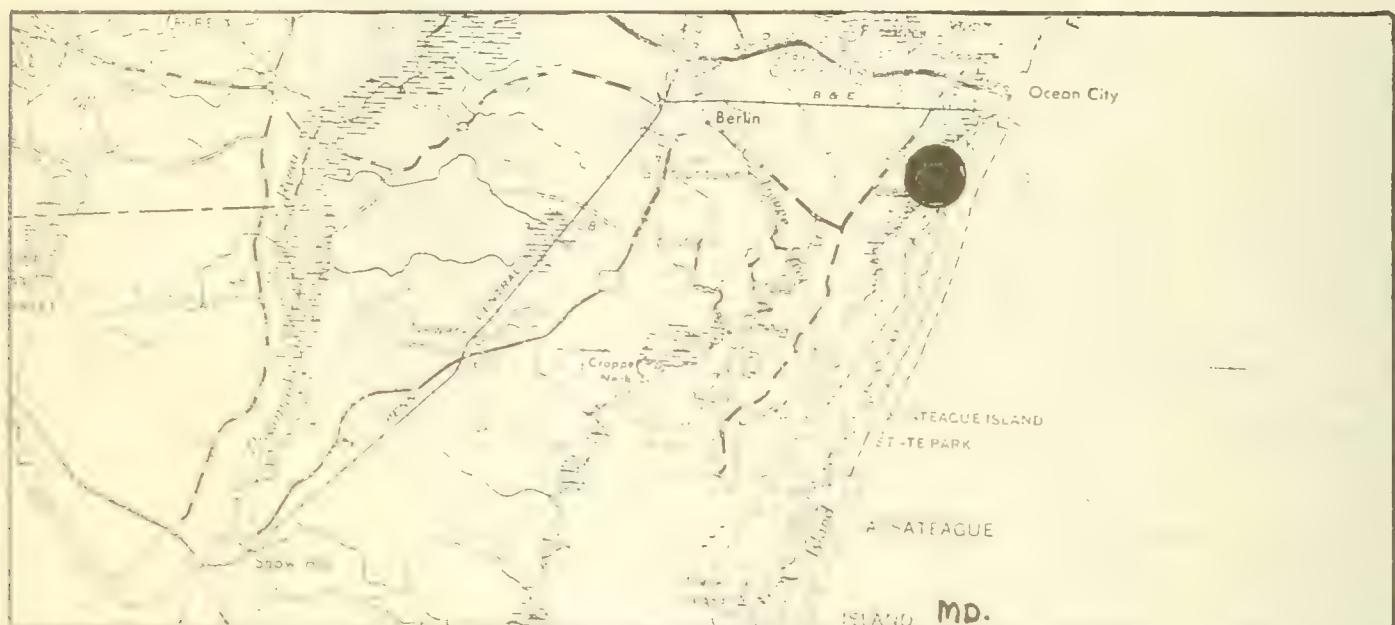
Chaffseed

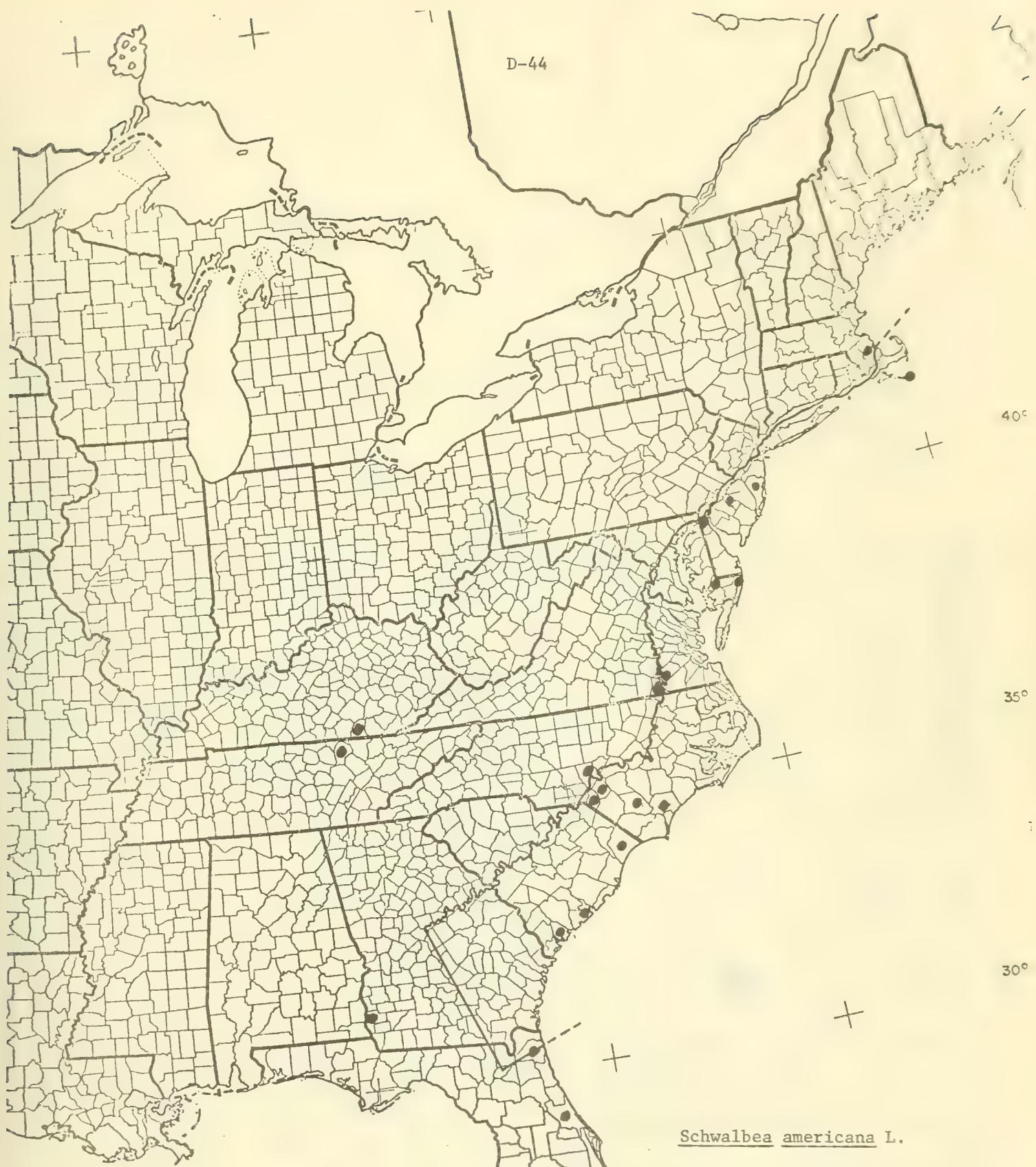
Habit: Herb

Habitat: Moist sandy soil; pinelands, oakwoods and clearings.

Range: New England south to Florida and Texas; Wicomico and Worcester Counties, Maryland; New Castle County, Delaware; and Greenville County, Virginia.

Status: Rare and endangered

Reference: U.S. National Herbarium
Gray Herbarium



Schwalbea americana L.

MILES
0 100 200 300 400

90°

85°

80°

75°

25°

CYPERACEAE

Scirpus flaccidifolius (Fern.) Schuyler

Habit: Herb

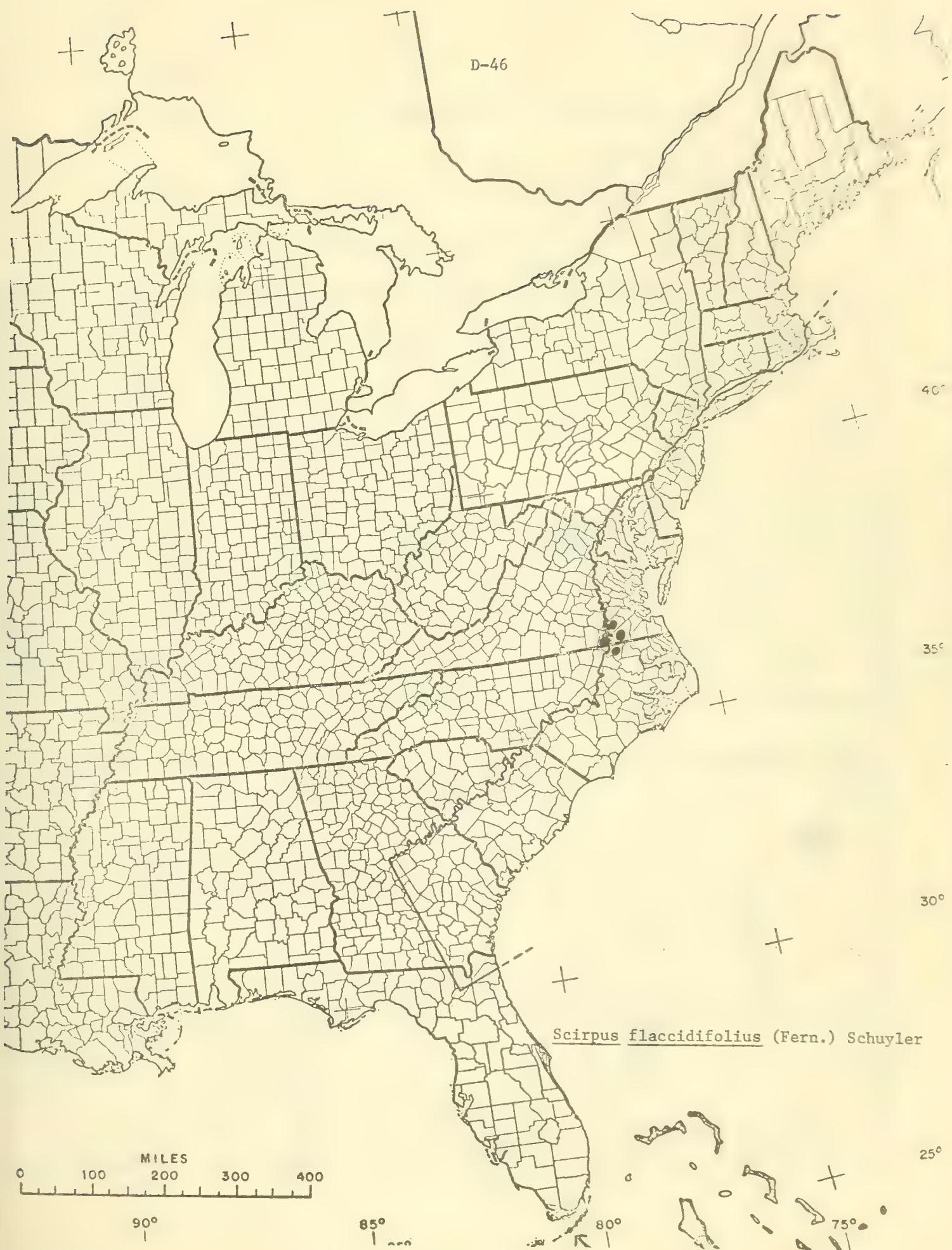
Habitat: Wooded alluvial bottomland

Range: Southeastern Virginia and northeastern North Carolina; Southampton County, Virginia.

Status: Endemic and rare.

References: Dr. A.E. Schuyler, Rhodora 69: 198-202, 1967.
U.S. National Herbarium





Trillium pusillum var. virginianum Fern.

Trillium

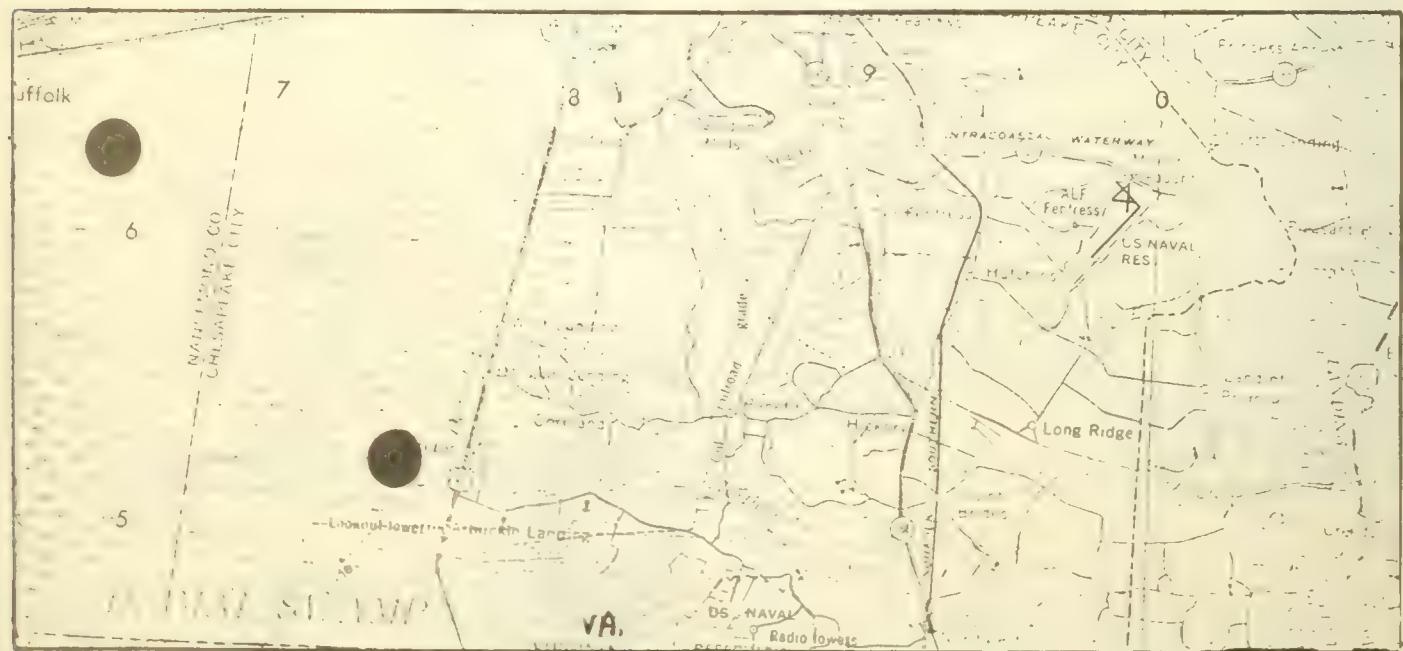
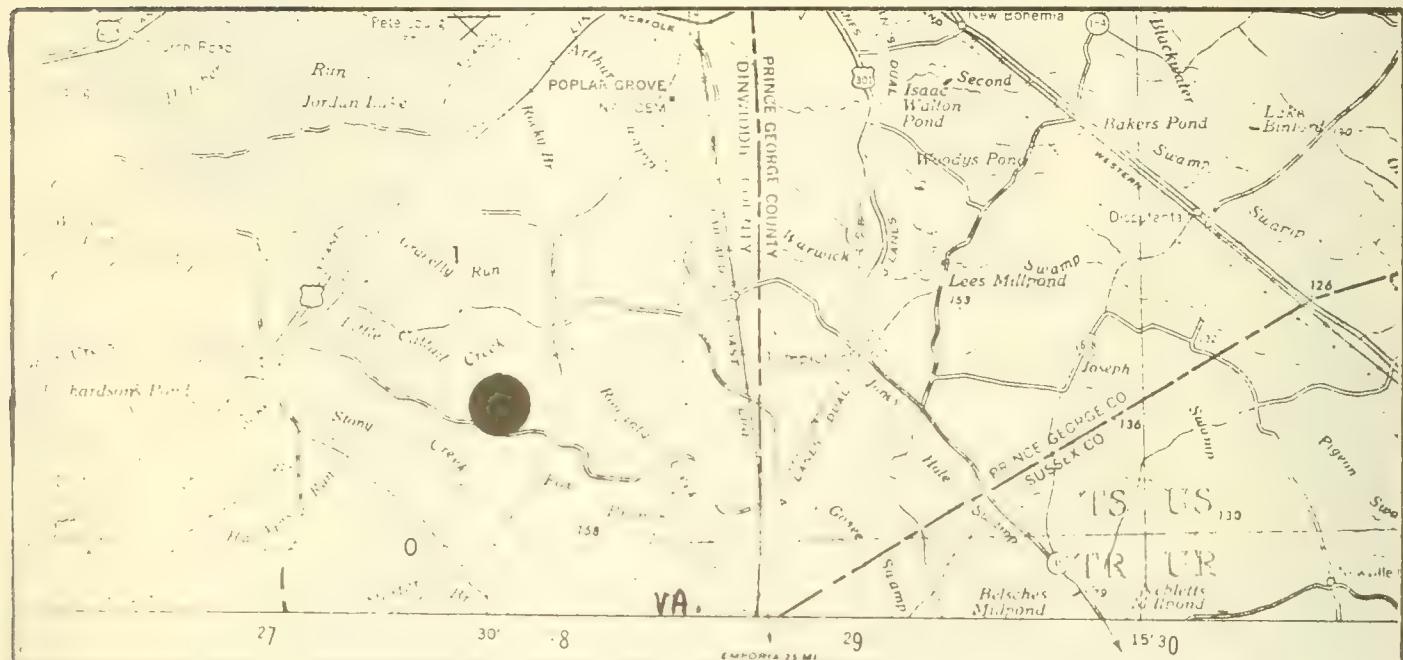
Habit: Herb

Habitat: Damp woodlands

Range: Southeastern Virginia, Nansemond Co. and Chesapeake City, Virginia.

Status: Rare and endangered

Reference: Brooke Meanley, Atlantic Naturalist, Vol. 24,
No. 1, Summer 1969





APPENDIX E

PRESENTLY PROTECTED AREAS OF CHESAPEAKE BAY

David W. Kunhardt
Research Assistant

and staff

SUMMARY OF PRESENTLY PROTECTED AREAS OF CHESAPEAKE BAY

<u>Ownership</u>	<u>Number of Sites</u>	<u>Acres</u>	<u>Hectares¹</u>
FEDERAL			
Military	43	266,000	107,500
National Wildlife Refuges ²	8	32,400	13,100
Other	20	56,200	22,700
STATE			
Forests	5	20,750	8,380
Parks	36	56,760	22,930
Wildlife Management Areas ³	30	78,700	31,800
Other	26	80,600	32,570
PRIVATE OR QUASI-PUBLIC	8	10,770	4,350
Total	602,200	243,300	

¹The hectare is a unit of area in the metric system. One hectare equals 10,000 square meters or 2.471 acres. There are approximately 258 hectares per square mile.

²Includes some land not in the N.W.R. system but administered by the U. S. Department of Interior's Bureau of Sport Fisheries and Wildlife.

³Includes some land not in the W.M.A. systems but held with identical management practices. Also includes Virginia Natural Areas.

PRESENTLY PROTECTED AREAS OF CHESAPEAKE BAY REGION

State of Maryland

<u>Ownership</u>	<u>Name</u>	<u>County</u>	<u>Hectares</u>	<u>Map Coordinates</u>
NATIONAL				
Military Air Force	USAF Transmitter Station Reservation	Anne Arundel	420	7-G
Army	Aberdeen Proving Grounds (Annex)	Harford	129	2-J
	Aberdeen Proving Grounds Reservation	Harford	13,445	2-K, 3-K, 3-L 4-J, 4-K
	Atkisson Reservoir (Army Chemical Center)	Harford	242	3-J
	Ft. George Meade Military Reservation	Anne Arundel	5,252	6-F, 6-G
	US Military Reservation (GlobeCom Radio Receiving Station)	Prince Georges	687	9-F
	US Military Reservation (Army Radio Receiving Center)	Charles	242	10-E
	Bloodsworth Island Bombing Range	Dorchester	<u>1,940</u>	13-L
		Subtotal (Army)	<u>21,937</u>	
Navy	US Naval Ordnance Lab	Montgomery, Prince Georges	388	6-E
	US Naval Academy Dairy	Anne Arundel	283	6-G
	US Naval Reservation	Anne Arundel	388	7-I
	US Naval Reservation	Prince Georges	263	8-F, 9-F
	US Naval Propellent Plant, Indian Head	Charles	889	10-C
	US Naval Research Lab, Cedar Point Neck	Charles	566	11-D
	US Naval Reservation	St. Marys	2,424	12-I
	US Naval Air Base	St. Marys	<u>388</u>	13-I
		Subtotal (Navy)	<u>5,5</u>	
	Total (Military)		27,946	

<u>Ownership</u>	<u>Name</u>	<u>County</u>	<u>Hectares</u>	<u>Map Coordinates</u>
NATIONAL National Wildlife Refuges (NWR)	Susquehanna NWR US Dept. of Interior Wildlife Research Center Eastern Neck NWR Blackwater NWR Martin NWR	Harford Prince Georges, Anne Arundel Kent Dorchester Somerset	4,050 287 923 4,531 1,786 Total (NWR)	3-L 6-F 6-K 11-K 14-L, 14-M, 15-L, 15-M 11,579
National Forests, Parks & Others (NFP)	US Dept. of Agriculture Research Center Greenbelt Park St. Elizabeth's Farm Ft. Foote Park Ft. Washington National Park Piscataway Park	Prince Georges Prince Georges Prince Georges Prince Georges Prince Georges Prince Georges, Charles	3,878 485 186 32 137 1,414 Total (NFP)	6-E, 6-F 7-E 8-D 8-D 9-D 9-D 6,132
STATE Forests	Total (NATIONAL)		45,657	
STATE Forests	Elk Neck State Forest Cedarville State Forests Doncaster State Forests Eastern Shore Experimental Forest or Wicomico State Forest Pocomoke State Forest	Cecil Prince Georges, Charles Charles Wicomico Worcester	1,108 1,414 591 444 4,828 12-P, 12-Q, 13-P, 13-Q, 14-P, 14-Q	2-M 9-F, 10-F 10-C 12-Q 8,385

<u>Ownership</u>	<u>Name</u>	<u>County</u>	<u>Hectares</u>	<u>Map Coordinates</u>
STATE Parks	Rock Ridge in Deer Creek State Park	Harford	263	2-J
	Susquehanna State Park	Harford	646	2-K
	Baltimore Falls State Park	Baltimore	2,424	3-H, 3-I
	Elk Neck State Park	Cecil	566	3-L, 3-M
	Patapsco State Park	Baltimore, Howard	2,510	4-F, 5-F, 5-G
	Gunpowder State Park	Baltimore	323	4-J
	Savage Park	Howard	61	5-F
	Guilford Park	Howard	182	5-F
	Ft. Smallwood State Park	Anne Arundel	40	5-I
	Severn Run Natural Environment Area	Anne Arundel	646	6-G, 6-H
	Sandy Point State Park	Anne Arundel	283	6-I
	Anacostia River Park + Indian Creek Park + Northwest Branch Park	Prince Georges	606	7-E
	Robert Watkins State Park	Prince Georges	194	7-F
	Wye Oak State Park	Talbot	9	7-L
	Tuckahoe State Park	Queen Annes, Caroline	1,535	7-M
	Poplar Island, Jefferson and Coaches Island	Talbot	50	8-J, 9-J
	Martinak State Park	Carolina	69	8-N
	Cosca Regional Park	Prince Georges	202	9-E
	Smallwood State Park	Charles	137	10-C
	Calvert Cliffs State Park	Calvert	606	11-I
	Burke State Park	Charles	57	11-B
	St. Mary's River	St. Marys	283	12-H
	St. Clement's Island	St. Marys	28	13-G
	Millburn Landing State Park	Worcester	101	13-Q, 14-Q
	Shad Landing State Park	Worcester	220	13-Q
	Point Lookout State Park	St. Marys	190	14-J
	Jane's Island State Park	Somerset	1,159	14-M, 14-N,
				15-M, 15-N
	Total (Parks)			<u>13,390</u>

<u>Ownership</u>	<u>Name</u>	<u>County</u>	<u>Hectares</u>	<u>Map Coordinates</u>
STATE Wildlife Management Areas (WMA)	Elkton WMAs	Cecil	356	2-M, 2-N, 3-M, 3-N
	C & D Canal Lands (Wildlife Management Agreement)	Cecil	1,212	2-N
	Millington Wildlife Demonstration Area	Kent	889	4-N
	Merkle WMA (on Patuxent River)	Prince Georges	444	9-G
	Idylwild Wildlife Area	Caroline	623	9-N
	Myrtle Grove WMA	Charles	304	10-D
	Harry Bowen WMA (on Patuxent River)	Prince Georges	121	10-G
	Linkwood WMA	Dorchester	126	10-M
	Taylor's Island WMA	Dorchester	393	11-J
	Le Compte Wildlife Refuge	Dorchester	137	11-M
	Fishing Bay WMA (north section)	Dorchester	3,673	11-L, 11-M, 12-L, 12-M
	Fishing Bay WMA (south portion)	Dorchester	888	12-M
	Ellis Bay WMA	Wicomico	773	12-M, 12-N
	Johnson WMA	Wicomico	63	12-P, 12-Q
	Foster Estate Wildlife Management Agreement with Maryland Fish and Game Dept.	Worcester	2,020	12-P
	Deal Island WMA	Somerset	4,028	13-M, 13-N
	Wellington WMA	Somerset	158	13-O, 13-P
	Fairmount WMA	Somerset	584	14-N
	Vaughn State WMA	Worcester	408	14-Q
	Cedar Island WMA	Somerset	1,215	15-M, 15-N
	Pocomoke Sound WMA	Somerset	3,645	15-N
		Total (WMA)	22,060	

<u>Ownership</u>	<u>Name</u>	<u>County</u>	<u>Hectares</u>	<u>Map Coordinates</u>
STATE	Loch Raven Reservoir, (city of Baltimore)	Baltimore	2,868	3-H
Other	Univ. of Maryland Plant Research Farm	Montgomery, Prince Georges	263	6-E
	Rocky George Reservoir	Montgomery, Prince Georges, Howard Anne Arundel	202	6-E, 6-F
	Crownsville State Hospital	Prince Georges	384	6-H
	Patuxent River Parcels	Anne Arundel	1,681	7-G, 8-G, 9-G
	North Basin Reservoir	Talbot	129	7-H
	Wye Oak Reservoir	Prince Georges	48	7-L
	Boys' Village of Maryland	Charles	404	9-F
	Southern Maryland Public Works Camp	Wicomico	40	10-F
	Salisbury Airport No. 2	Total (Other)	<u>263</u>	12-P
		Total (STATE)	<u>6,282</u>	
			50,117	
QUASI-PUBLIC or PRIVATE (QPP)	Whitaker Iron Co. 1 & Wildlife Management Agreement	Cecil	1,818	1-L, 1-M, 2-L, 2-M
	Broad Creek Memorial Scout Camp	Harford	485	1-J
	Camp Rodney Scout Preservation	Cecil	444	2-M
	Beltwoods	Prince Georges	16	7-F
	CBCES-Smithsonian Institution	Anne Arundel	808	7-H, 8-H
	Wye Institute	Queen Annes	61	7-I
	Battle Creek Cypress Swamp (TNC)	Calvert	40	11-H
		Total (QPP)	<u>3,672</u>	
			99,446	
			TOTAL FOR THE STATE OF MARYLAND	

<u>Ownership</u>	<u>Name</u>	<u>County</u>	<u>Hectares</u>	<u>Map Coordinates</u>
<u>NATIONAL</u>				
Military				
Air Force	Langley Air Force Base	Hampton City	<u>1,212</u>	22-I, 22-J
Army	Ft. Belvoir Military Reservation	Fairfax	2,707	8-C, 8-D, 9-C, 9-D
	US Military Reservation (Radio Tower)	Prince William Caroline	444 28,967	9-C 13-A, 13-B, 13-C, 14-A, 14-B, 14-C
	A.P. Hill Military Reservation			
	Ft. Lee Military Reservation	Prince Georges James City	1,778 81	20-B 21-G
	Camp Wallace Military Reservation	Newport News City	2,304	21-G, 21-H
	Ft. Eustis Military Reservation	York	1,212	21-J, 22-J
	US Military Reservation (Plum Tree Island Bombing Range)			
	US Military Reservation	Northampton	194	21-M
	US Military Reservation	Newport News City	485	22-I
	Big Bethel Reservoir	Newport News City	162	22-I
	Ft. Monroe Military Reservation	Hampton City	81	22-J
	US Military Reservation	Isle of Wight	61	23-H
	Ft. Story Military Reservation	Virginia Beach City Total (Army)	<u>364</u> <u>38,840</u>	23-L
Navy	US Naval Reservation (Dahlgren Weapons Lab)	King George	1,495	12-D
	Camp Peary Naval Reservation	York	3,759	19-G, 20-G
	Naval Supply Center	York	1,414	20-G, 20-F
	US Naval Weapons Station	York	4,121	20-G, 20-H, 21-G, 21-H
	US Naval Supply Center	York	122	21-H
	Craney Island US Naval Supply Center	Chesapeake City	1,091	23-I, 23-J

<u>Ownership</u>	<u>Name</u>	<u>County</u>	<u>Hectares</u>	<u>Map Coordinates</u>
NATIONAL Military Navy	US Naval Reservation, Little Creek Amphibious Base US Naval Transmitter Station Oceana Naval Air Station US Naval Reservation (Fentress Landing Field)	Virginia Beach City Nansemond Virginia Beach City Chesapeake City	263 323 1,010 364	23-K 24-H 24-L 25-K, 25-L
Other	US Coast Guard Station Quantico Marine Corps Schools	Total (Navy) Prince Georges Prince William, Stafford Total (Other)	13,962 525 25,048 25,573	21-B 9-A, 9-B, 10-A, 10-B, 11-A, 11-B
		Total (Military)	79,587	
National Wildlife Refuges (NWR)	Mason Neck NWR Presquile NWR Fisherman's Island Wildlife Refuge	Fairfax Chesterfield Northampton Total (NWR)	580 536 404 1,520	9-C 19-B, 19-C, 20-B, 20-C 22-M
National Forests, Parks & Others (NFP)	George Washington Memorial Parkway Tidal Marshes Prince William Forest Park District of Columbia Dept. of Corrections, Lorton Reformatory Ft. Hunt National Park Fredericksburg and Spotsylvania National Military Park George Washington Birthplace National Monument	Alexandria City Fairfax Prince William Fairfax Alexandria City 65 194 7,353 1,252 121 1,010 159	8-D 8-D 9-A, 10-A, 10-B 9-B 9-D 12-A 13-E	

<u>Ownership</u>	<u>Name</u>	<u>County</u>	<u>Hectares</u>	<u>Map Coordinates</u>
NATIONAL NPF	Pamunkey Indian Reservation Richmond National Battlefield Park Harrison Lake National Hatchery Petersburg National Military Park Colonial National Historical Park	King William Hanover, Henrico Charles City Prince Georges James City	404 303 180 525 3,810	18-D, 18-E 19-B, 19-C 20-C 21-B 20-F, 21-F, 21-G, 21-H, 21-I
	Total (NFP)		<u>15,376</u>	
	Total (NATIONAL)		96,483	
STATE Parks	Bull Run Regional Park Pohick Bay Regional Park Mason Neck State Park Westmoreland State Park York River State Park Chippokes Plantation State Park Lake Maury (Mariners' Museum Park) Seashore State Park Sleepy Hole Park	Fairfax Fairfax Fairfax Westmoreland James City Surry Newport News City Virginia Beach City Nansemond	65 5,252 768 525 1,212 404 283 929 106	9-A 9-C 9-C 13-E, 13-F 19-G 21-G 22-I 23-L 24-H
	Total (Parks)		<u>9,544</u>	
Wildlife Management Areas (WMA)	Lands End WMA Michael Marsh WMA Saxis Waterfowl Management Area and Refuge Parkers Marsh Natural Area Hog Island State Waterfowl Refuge Game Refuge Pond (Nebblets Mill Pond) Charles C. Steirly Natural Area	King George Accomack Accomack Accomack Surry Sussex Sussex	190 1,010 2,075 307 364 61 8	13-D 15-0 15-0 17-N 21-G 22-C 22-E
	Total (WMA)		<u>4,015</u>	

<u>Ownership</u>	<u>Name</u>	<u>County</u>	<u>Hectares</u>	<u>Map Coordinates</u>
STATE	Gunston Hall	Fairfax	226	9-C
Other	Elko Tract	Henrico	808	19-C
	Diascund Creek Reservoir	New Kent	7,676	19-E, 19-F
	Eastern State Hospital Reservation	James City	202	20-F
	Waller Mill Reservoir	York	5,656	20-G
	Skiffles Creek Reservoir	James City, Newport News	202	21-H
	City Reservoir, Hardwoods Mill Reservoir	York, Newport News City	2,949	21-H, 21-I
	Collisium Park	Hampton City	61	22-I
	Langley View Park	Hampton City	32	22-J
	Salt Ponds	Hampton City	61	22-J
	Northend Point Natural Preserve	Hampton City	242	22-J
	Lake Whitehurst, Norfolk Municipal Gardens and Airport	Norfolk City	5,252	23-K
	Lake Burnt Mills Reservoir	Isle of Wight, Nansemond	455	23, 24-G
	Lake Prince Reservoir	Isle of Wight	989	24-G, -H
	Lake Cohoon Reservoir	Nansemond		
	Western Branch Reservoir	Nansemond	459	24-G, 25-G
	Lake Meade Reservoir	Nansemond	710	24-H
		Total (Other)	<u>310</u>	24-H
		Total (STATE)	<u>26,290</u>	
	Alexander Berger Memorial Sanctuary	Spots and Caroline Williamsburg City	327	13-A
	College of William and Mary		355	21-G
PRIVATE		Total (Private)	682	
	TOTAL FOR THE STATE OF VIRGINIA		137,014	

STATE OF DELAWARE

<u>Ownership</u>	<u>Name</u>	<u>County</u>	<u>Hectares</u>	<u>Map Coordinates</u>
WMA	Petersburg State Wildlife Area Nanticoke Wildlife Area	Kent Sussex	5,252 485	6-0 10-0
	TOTAL FOR THE STATE OF DELAWARE		5,737	

DISTRICT OF COLUMBIA

D.C.	Theodore Roosevelt Island	D.C.	36	7-D
National	National Arboretum	D.C.	808	7-E
Other	and Kenilworth Aquatic Gardens and Anacostia Park			
	Fort DuPont Park	D.C.	356	7-E, 8-E
	and Fort Chaplin Park and Fort Dairs Park and Fort Stanton Park			

TOTAL FOR THE DISTRICT OF COLUMBIA

1,200

GRAND TOTAL

244,025

4. Existing Preserved Natural Areas

Designation of preserved natural areas is difficult since there are different types of preservation and protection. State and federal forests preserve flora and fauna but are subject to cutting, management, and multiple use. State and federal parks have much human use and are subject to management and partial development for recreation. The status of State and federal wildlife management areas and refuges is also variable since they preserve wildlife and flora, but are subject to management and change.

There are 17 sites (Table 3) which may be considered as preserved natural areas, but the status of some of these areas are not clear, particularly those preserved by State departments as forests, parks, or refuges. This list should be considered as very tentative, since some of the areas may not qualify as fully preserved natural areas.

The Nature Conservancy sites, the Natural Landmark areas, and the Smithsonian Institution areas can be considered as preserved natural areas. The State of Virginia has designated three natural areas--Charles C. Steirly Natural Area, Parkers Marsh Natural Area, and Seashore Natural Area. The latter is also a State Park with some tourist facilities and use.

TABLE 3. PRESERVED NATURAL AREAS

	<u>Size of Area (Hectares)</u>	<u>Owner</u>	<u>Type of Area</u>	<u>Preservation</u>
Hellen Creek Hemlock Preserve, Md.	36	Nature Conserv.	Hemlock Outlier	Good
Alexander Berger Memorial Sanctuary, Va.	346	"	Diverse Veg. & Wildlife	Good
Hambleton Island	11	"	Virgin Cedar & Pine	Good
Battle Creek Cypress Swamp, Md.	40	"	Cypress Outlier	Good; Landmark
Charles C. Steirly Natural Area, Va.	8	State of Virginia	Cypress & Tupelo	Good
Long Green Creek Valley and Sweathouse Branch, Md.	101	State of Md. Park	Forests and Rivers	Good
Belt Woods, Md.	16	Episcopal Church	Virgin Mature Forest	Proposed Landmark
Parkers Marsh Natural Area, Va.	307	State of Virginia	Tidal Marsh	Good
Patuxent River Wildlife Research Center, Md.	286	BSFW	Forests and Wildlife	Good; SAF Area
Seashore Natural Area, Va.	606	Va. State Park	Dunes and Forests	Good; Landmark
Mill Creek Bird Sanctuary, Md.	62	Quasi-Public	Oak-Pine Forest	Good
Hock Tract, Md.	6	Md. State Road Com.	Virgin Forest	Good
Corcoran Tract (Part of Sandy Point State Park), Md.	56	Md. State Forest & Pk	Virgin Oak & Pine	Good
Smithsonian Chesapeake Bay Center for Environmental Studies, Md.	808	Smithsonian Institution	Forests & Marshes	Good
LeCompte Bryant Fox Squirrel Refuge, Md.	137	Md. Dept. Game & Fish	Hardwood & Softwood	Good
Pocomoke River Swamp, Md. (over 7,000 ha.)	202	Quasi-Public & State	Cypress & Cedar Swamp	Partly Preserved
Poplar Island, Jefferson and Coaches Islands, Md.	50	Smithsonian Institution	Forest & Marshes	Good
Total	3,078			

SMITHSONIAN INSTITUTION LIBRARIES



3 9088 00315816 9

nh QH104.5.C45N2

Natural areas of the Chesapeake Bay Regi